

Refrigeration Service Engineer

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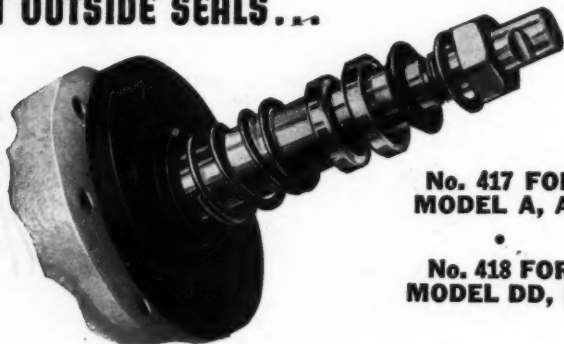
No. 8



HAVE YOU TRIED

CHICAGO SEALS *for*

**USE ON UNIVERSAL COOLER COMPRESSORS
WITH OUTSIDE SEALS...**



**No. 417 FOR
MODEL A, AA**

**No. 418 FOR
MODEL DD, FF**

FOR BETTER PERFORMANCE USE

**CHICAGO
VALVE PLATES**

SOLD THROUGH LEADING



Chicago Seals
MODERN DESIGN

**CHICAGO
SEALS**

REFRIGERATION WHOLESALERS

CHICAGO SEAL CO.

**332 S. HOYNE AVE.
CHICAGO 12, ILL.**

THE REFRIGERATION SERVICE ENGINEER, Nickerson & Collins Co., Publishers, 423-425 N. Waller Ave., Chicago 44, Ill. Published monthly, Vol. 16, No. 8, August, 1948. Entered as second-class matter March 4, 1938, Chicago, Ill., under the Act of March 3, 1879. Additional entry at Beloit, Wis., April 15, 1948. Copyright 1948. Subscription in the U. S. \$3.00 per year, other countries \$4.00.

Aug

The Ansul Research Staff

REPORTS ON:

SLUDGES

Approximately 90% of the sludges produced in refrigerating systems are due to moisture. The exact cause can always be determined by analysis, but the appearance of the sludge (see photos) is usually indicative of the cause.

SLUDGE DERIVED FROM MOISTURE—

If water is present in a machine, the nature of the sludge depends upon the type of refrigerant and length of time the water is present. All refrigerants ... sulfur dioxide, methyl chloride, Carrene and "Freon-12" ... react with water to produce corrosion products characteristic of each. To prevent sludge, the amount of water present in a refrigerating system must be small enough to avoid ice separation and corrosion. For "Freon-12" and methyl chloride, a quantity of water approximately .05% by weight will cause corrosion; the limit is somewhat higher for sulfur dioxide.

SLUDGE DERIVED FROM OILS—Oil sludges are characterized by total or partial solubility in carbon tetrachloride, gasoline and similar solvents. It is generally presumed that oil sludges are due to two causes: (1) an interaction between the unsaturated constituents of the oil and the refrigerant; (2) a breakdown of the oil due to heat, oxidation, friction, etc.

ANSUL WHOLESALERS are ready and equipped to render an intelligent, co-operative service to refrigeration engineers and maintenance men on problems which arise from time-to-time in the operation of refrigerating systems.

FOR EXAMPLE:

Samples of ice machine oils, submitted by users of Ansul Refrigerants to Ansul Wholesalers, are tested by the Ansul Standard Wax-Oil Separation Method. This approved method, developed and standardized especially for use in connection with oils used in refrigerating systems, provides an accurate determination of the amount of wax which separates from an oil at low temperatures.

Ansul Refrigerants are available at leading wholesalers everywhere.

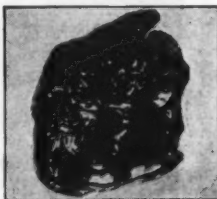


**SEND FOR
"SLUDGES"**
by Ansul
Research Staff

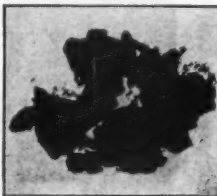
A detailed analysis of the refrigeration sludge problem.



GRANULAR SLUDGE
... due to moisture



FLUID SLUDGE
... due to oil



HARD SLUDGE
... due to moisture and oil



REG. U. S. PAT. OFF.

ANSUL CHEMICAL COMPANY

REFRIGERATION DIVISION, MARINETTE, WISCONSIN

DISTRIBUTORS FOR: KINETIC'S "FREON 11," "FREON 12," "FREON 21," "FREON 22," "FREON 113" AND "FREON 114"

Championship Performance "DETROIT" SOLENOID VALVES



Powerful, reliable "Detroit" Solenoid Valves give championship performance. Over a period of many years, they have shown their excellence in handling refrigerant, water and other liquids not injurious to brass. They are quiet, and operate instantaneously and unfailingly.

August, 1948

2

THE REFRIGERATION

★ **EASILY INSTALLED**—Substantial mounting boss valve body provides easy means for rigid mounting.

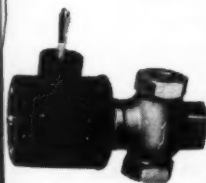
★ **EASILY SERVICED**—May be dis-

No. 596—A heavy duty pilot operated valve which requires pressure drop of only 1 1/2 psi on refrigerant or 1 psi on water. Two orifice sizes, 1/2" and 3/4".



SEE

- ★ **EASILY INSTALLED**—Substantial mounting base. Valve body provides easy means for rigid mounting.
- ★ **EASILY SERVICED**—May be disassembled for cleaning without disconnecting refrigerant lines or wiring.
- ★ **POSITIVE CLOSING**—Nonmagnetic needle and seat and strong "kick off" spring assure tight closing.
- ★ **POWERFUL**—Will lift against high pressure.
- ★ **QUIET**—Design of plunger and guide tube minimizes AC hum.
- ★ **DURABLE**—Moisture proof coils; bodies of nonporous cast brass; long wearing needles and seats; give these valves exceptionally long life.
- ★ **ECONOMICAL**—Current demand low (15 watts open on largest valve). Replacement parts if needed, are inexpensive.
- ★ **FOUR LEAD COIL**—For either 115 or 230 volt, 60 cycle use available on any "Detroit" Solenoid Valve.



No. 638—A heavy duty pilot operated valve which requires pressure drop of only 1 1/4 psi on refrigerant, 5 psi on water. Two orifice sizes, 3/8" and 1/2".

Nominal Capacities—liquid line
(2 lbs. pressure drop)

1/2" orifice 11 tons Freon-12 23 tons Methyl
3/8" orifice 17 tons Freon-12 34 tons Methyl

No. 632-3 Like all "Detroit" Solenoids, this valve is designed for use on any liquid not injurious to brass. Available with three orifice sizes, 1/2", 3/8", 1/4".

Nominal Capacities—liquid line
(2 lbs. pressure drop)

1/2" orifice 1 1/2 tons Freon-12 2 3/4 tons Methyl
3/8" orifice 3 tons Freon-12 6 1/2 tons Methyl
1/4" orifice 3 3/4 tons Freon-12 8 3/4 tons Methyl
3/8" female N.P.T. connections.



No. 632—Pilot operated for larger capacity; requires minimum pressure drop of only 1 psi to operate piston.

Nominal Capacity—liquid line
(2 lbs. pressure drop)

7 1/2 tons Freon-12—17 tons Methyl
1/2" female N.P.T. connections.



No. 635 Strainer—Fits any threaded solid valve. Fine mesh monel screen prevents dirt from entering. Slips into adapter and is held in place by tubing and flare nut. Adapters furnished in three sizes of valve connection, and six sizes of tubing connection:

Adapters with 1/4", 3/8" or 1/2" SAE tubing connection are available with 1/2" MPT valve connection.

Adapters with 1/2" or 3/4" SAE tubing connection are available with 1/2" MPT valve connection.

Adapters with 1/2" or 3/4" SAE tubing connection are available with 3/4" valve connection.

Cleaning or replacing strainer screen is very easy—just unscrew flare nut.

5114

DETROIT LUBRICATOR COMPANY

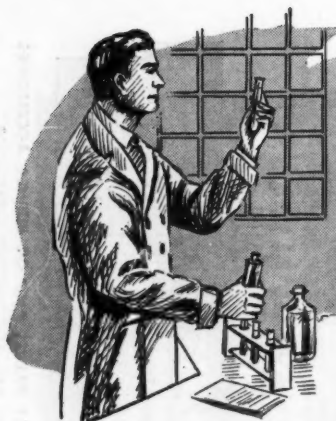
DIVISION OF AMERICAN RADIATOR & Standard Sanitary CORPORATION

General Offices: 5900 TRUMBULL AVENUE, DETROIT 8, MICHIGAN

Canadian Representatives—RAILWAY AND ENGINEERING SPECIALTIES LIMITED, MONTREAL, TORONTO, WINNIPEG

"DETROIT" HEATING AND REFRIGERATION CONTROLS • ENGINE SAFETY CONTROLS • FLOAT VALVES AND OIL BURNER ACCESSORIES
"DETROIT" EXPANSION VALVES AND REFRIGERATION ACCESSORIES • STATIONARY AND LOCOMOTIVE LUBRICATORS





*Let's talk
about
Chemistry!*

THAWZONE DATA

That a chemical agent is needed in a refrigerating system is not always immediately apparent to the engineer.

The ideal refrigeration unit would have an inert fluid circulating in a system made up of completely inert parts. This is, of course, impossible to realize in practice. The most carefully installed system contains traces of air, moisture, acids and other impurities.

THAWZONE

PATENTED

The PIONEER FLUID DEHYDRANT

In other types of systems, such as aircraft radiators, hydraulic brakes, gasoline, etc. it has been found practical to use inhibitors to correct a situation, rather than to try to reach the ideal state in which corrosion and reactions do not occur. Similarly, in a refrigeration system THAWZONE is used to remove traces of water and air that cause freeze-ups and corrosion.

THAWZONE is a practical solution to the problem of impurities which are difficult to prevent or remove by other means. Ten years of constant use have shown that THAWZONE, as an additive agent to refrigeration systems, is eminently practical.

HIGHSIDE CHEMICALS CO.

195 VERONA AVE.

NEWARK 4, N. J.

ALSO MAKERS OF

TRACE*

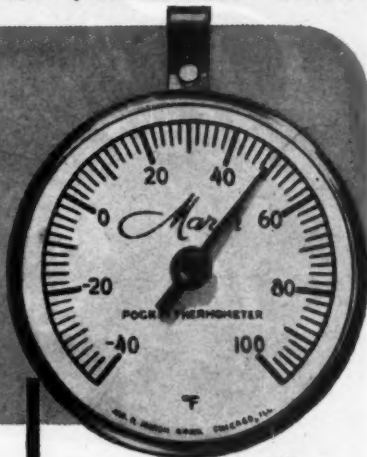
REFRIGERANT
LEAK DETECTOR



*TRADE MARK REG. U. S. PAT. OFF.

Handiest and best Pocket Thermometer ever!

THE *New* MARSH POCKET THERMOMETER



It's watch-like in size and style. Easy to read in poorest light. Highly accurate. Has "Recalibrator slide" to keep it accurate. Rugged—in handsome, polished case of durable, heavy-gauge stainless steel. Unbreakable crystal. Sold at an unbelievably low price.

No guessing at error caused by handling or room temperature as with hard-to-read glass tube thermometers. Just place this instrument in freezing compartment, close refrigerator until temperature registers, open refrigerator and instantly read temperature on clear, legible dial.

This is a handy addition to every refrigerator serviceman's kit, developed by Marsh out of 80 years' experience in precision-instrument making.

JAS. P. MARSH CORPORATION
DEPT. Q, SKOKIE, ILLINOIS

Actual size
above
(2-3/16"
diam.)
Typical Marsh
value. \$2.00



Clip holds Thermometer in pocket; also serves as hanger when used in refrigerator. Clip swivels to fit any position.

If ever knocked out of adjustment Thermometer has this "Recalibrator slide" for quickly correcting it to a thermometer of known accuracy.



Your Jobber has it in stock

MARSH

BUY FROM YOUR WHOLESALER

Refrigeration Instruments

Takes No Storage Space

FROM
A
COOLER



Gilterpure

HALF ROUND CEILING UNIT

For Walk-ins and Florist Boxes.

Installed on the ceiling adjacent to wall, completely out of the way. Cooler is blanketed with low velocity air, with a relative humidity in excess of 85% thru a 180° arc. Equipped with Air Purification—Built-in Louvres—Built-in Liquid Distributor—Slide Hangers. Made in 6 popular sizes from 260 to 867 BTU per 1° TD. Highly efficient, compact, streamlined.

Sold by Leading Refrigeration Wholesalers

BETZ CORPORATION

HAMMOND • INDIANA

MOUNTS
AGAINST
CEILING
NEXT TO
WALL

● Yo
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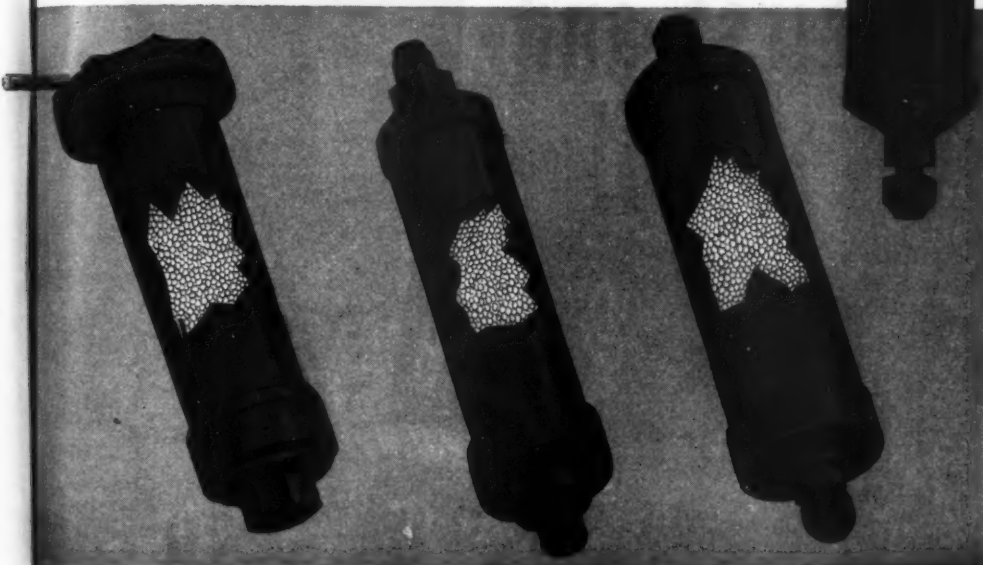
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Specify S/V Sovabead for your Dehydrators



New Type Silica Gel Desiccant in Bead Form Offers Many Advantages

● You can be sure of maximum moisture adsorption when you get S/V Sovabead in your dehydrators.

Controlled laboratory tests show that these new beads, developed by Socony-Vacuum, are capable of reducing the moisture content of Freon 12 Refrigerant to as low as .0002 of one percent.

What's more, the uniform beads offer less resistance to the flow of liquid and gaseous refrigerants than other desiccants. You get less dusting and attrition loss.

So make certain of a superior desiccant next time you order dehydrators. Specify this new

bead type desiccant from your supplier.

This table shows maximum drying effects of desiccants obtained in tests conducted by an independent laboratory. Standard dehydrators containing the activated desiccant were flooded with wet refrigerants and analyses were made after at hourly intervals.

REFRIGERANT	DESICCANT	INITIAL MOISTURE	AFTER 1 HOUR	AFTER 2 HOURS	AFTER 3 HOURS
"Freon 12"	S/V Sovabead	0.0060	0.0008	0.0006	0.0002
"Freon 12"	Silica Gel	0.0060	0.0008	0.0006	0.0002
Methyl Chloride	S/V Sovabead	0.0160	0.0029	0.0025	0.0020
Methyl Chloride	Silica Gel	0.0160	0.0029	0.0025	0.0020

Socony-Vacuum Process Products

SOCONY-VACUUM OIL COMPANY, INC., 26 Broadway, New York 4, New York,
and Affiliates: MAGNOLIA PETROLEUM COMPANY, GENERAL PETROLEUM CORPORATION



First and Only!

Load Carrying
2-POLE SWITCH

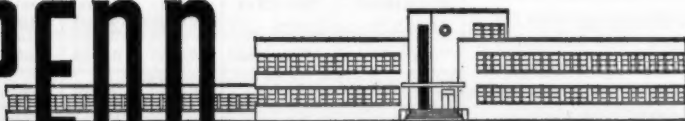
DIRECT READING
Calibrated Scale



PENN
270
SERIES

Write now for Bulletin No. 2652 with full details about the Penn 270 Series refrigeration and air conditioning control that sets a new standard of versatility, simplicity, efficiency and dependability. **Penn Electric Switch Co., Goshen, Indiana.** Export Division: 13 E. 40th St., New York 16, U. S. A. In Canada: Penn Controls, Ltd., Toronto, Ontario.

PENN



AUTOMATIC CONTROLS

FOR HEATING, REFRIGERATION, AIR CONDITIONING, ENGINES, PUMPS AND AIR COMPRESSORS

YOUR WHOLESALE HAS THEM RIGHT NOW No more shortages!

There are no more shortages of Mueller Brass Co. valves, fittings and accessories for refrigeration purposes. The condition which we have all had to endure through the war years, and the building-up period, has ended.

We know what every jobber has had to put up with in his efforts to get the material he wanted—we realize, also, the trouble that the service engineer has faced to complete his jobs. We are now happy to say that our line is exceptionally complete.

Service engineers can place full confidence in Mueller Brass Co. time-tested valves and fittings. Strict laboratory control, skilled engineering, highest quality materials, precision workmanship, and rigid inspection, combine to make these products constantly dependable.

**ORDER FROM YOUR WHOLESALE.
HE HAS THEM NOW.**



HEAD TE



WROUGHT COPPER TEE



HALF UNION ELBOW



PORT-IN-LINE VALVE



ADJUSTABLE COMPRESSOR VALVE



TWO-WAY DIAPHRAGM VALVE



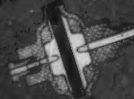
UNION



DOUBLE PORT



90 DEGREE ANGLE



LINE FILTER WITH CAPILLARY TUBE CONNECTION



CARTRIDGE TYPE ANGLE DRIER



HEAT EXCHANGER—COIL TYPE



HEAT EXCHANGER—FOUNTAIN TYPE

**MUELLER
BRASS CO.**
PORT HURON,
MICHIGAN

IT'S THE **ROTARY IMPACT**

THAT DOES IT

**NO KICK
NO TWIST
EVEN ON THE
TOUGHEST JOBS**

**AMAZING
all-purpose
ELECTRIC TOOL
will**

- Drill up to $\frac{1}{4}$ " dia.
- Ream up to $\frac{1}{2}$ " dia.
- Tap up to $\frac{1}{2}$ " dia.
- Run Nuts up to $\frac{3}{4}$ " dia.
- Drive Screws up to $\frac{3}{4}$ " dia.
- Hole Saw up to $1\frac{1}{2}$ " dia.
- Bore Wood up to $2\frac{1}{2}$ " dia.
- Drive Studs up to $\frac{3}{4}$ " dia.
- Drill Masonry up to $\frac{3}{4}$ " dia.
- Extract Broken Studs up to $\frac{3}{4}$ " dia.
- Wire Brush up to $\frac{3}{4}$ " dia. shanks.

(Uses Standard Attachments)



AMAZING! No Kick—No Twist—Even if you stall the spindle completely, the motor continues to run.

AMAZING! It's Reversible—full power in either direction—runs on 110V ac-dc.

AMAZING! It saves up to 90% of the time on nut-running operations alone.

AMAZING! With Standard Attachments you need only **ONE INGERSOLL-RAND IMPACT TOOL** to do all operations.

Call your nearest distributor for a demonstration

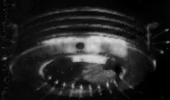
Ingersoll-Rand

11 BEDFORDWAY, NEW YORK 4, N. Y.

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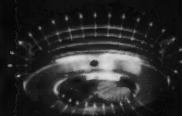
NEW **DOME** COOLER

ONE OF THE BIG THREE OF 1948



Two-way Dome Cooler with air flow limited to two directions.

Model No.	List Price	Capacity BTU per Hr.
		1° T.D.
67	\$ 65.07	65
97	77.55	95
127	88.55	125
227	122.60	225
327	157.30	325
457	215.60	450
607	258.50	600
907	313.50	900
1257	412.50	1250



Standard Dome Cooler with air emitting in all directions.

The new, improved 1948 model of the Peerless Dome Cooler, the cooler that went to war and made a record for distinguished service! Here, with beautiful spun aluminum casing and the new Peerless Coil, is the proud successor to the 20,000 Dome Coolers that cooled the food for all U. S. Army Cantinments from the start of World War II. In the Dome Cooler, air from the refrigerator is drawn up in the center of the unit and discharged horizontally along fixture ceiling to drop down the side walls. The Dome Cooler is the ideal unit for maintaining high humidities in reach-in and walk-in coolers. Its installation is a simple operation, it occupies minimum space, and it is engineered for correct functioning and long life. Complete with built-in heat exchanger and suction spinner.

SEND FOR ENGINEERING DATA

FOR BOX TEMPERATURES ABOVE 32°
FOR USE WITH FREON, METHYL CHLORIDE
AND SULPHUR AS REFRIGERANT



PEERLESS of AMERICA, Inc.

2901 LAWRENCE AVE.

CHICAGO 25, ILLINOIS, U. S. A.

CROSLEY

Twice Tested

REFRIGERATION PARTS

for general replacement



**IMMEDIATE
DELIVERY**

from your nearest

CROSLEY

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*Indicates distributors equipped to furnish complete repair service on Crosley Hermetically Sealed Refrigeration Systems.

Write your distributor for free Crosley Service Parts Catalog.

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- *New Haven, Conn. . . H. M. Tower Corp.
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Walding-Kinnan & Marvin Co.

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LOOK FOR this emblem on the outside of every package of refrigeration parts you buy. It's your guarantee of quality parts *inside*.

Special Buy!



CONDENSER FAN MOTORS Those dependable DELCO motors at a low price! These rugged motors are 1/250 h. p., 110 V—have straight shaft 1/4 dia. 11/16 long. Order from your Crosley distributor. No. 94605 for motor with fan—your cost, only \$4.90. Without fan, No. 94604—your cost, only \$4.42. Motors shipped with support bracket and mounting screws separate.



Available Now!

PLASTIC CUBE SEPARATOR

A fast seller! Colored plastic grid allows removal of one cube or a tray full. Holds 14 cubes — overall size 12" x 1/4" x 1 1/2". Retail for \$2.95. Your cost, only \$2.06. Order from your Crosley distributor. No. 93910.

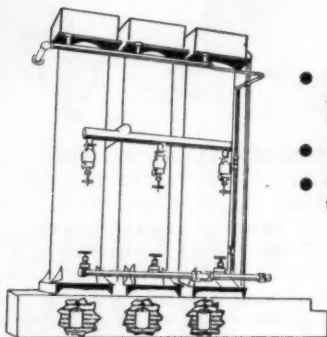
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Division—**ALCO** Manufacturing Corporation
Cincinnati 25, Ohio

The CSCO AQUATROL

A Simple But Very
Efficient Device Designed To

DESTROY ALGAE



- Helps to Prevent Further Accumulation of ALGAE, SLIME, SCALE and ENCRUSTING MATTER on Heat Exchange Surfaces
- Helps to Increase Volume of Production
- Helps to Decrease Percentage of Production Cost

In Air-Conditioning Systems, Cooling Towers, Spray Ponds, Cooling Water Circulation Systems, Air-Wash Systems, Barometric Condensers, Cooling sides of Evaporating Condensers, Ice Plants, Vertical Condensers, All Heat-Exchange

Systems, Cleaning Roots out of Pipe Lines.

AQUATROL consists of chemicals in a container which is to be placed in those parts of your cooling system affected by ALGAE, SLIME, SCALE AND ENCRUSTING MATTER. Water flowing through the container is treated with chemicals which are so perfectly balanced they convert the above mentioned destructive forces into precipitates which collect in the bottom of the cooling system and are easily removed. The flow of this chemically treated water may be regulated to avoid unnecessary waste.

CSCO AQUATROL eliminates the daily dosing of water with compounds . . . and needs no further attention other than to place new tablets in the device as needed. SAVES TIME! SAVES MONEY! SAVES LABOR! Protects and prolongs the life of equipment and helps the equipment give more efficient service!

AQUATROL Outfit for small operation, \$15 f.o.b. Birmingham.

For larger operations, \$25 f.o.b., Birmingham

CHEMICAL SOLVENT COMPANY

3005—16th Street North

Birmingham, Ala.

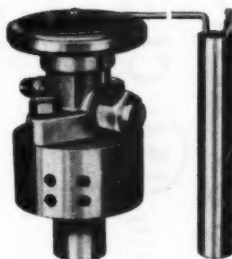


When poor distribution "short-circuits" the refrigerant through only a few passes, coil capacity is often cut $\frac{1}{3}$ to $\frac{1}{2}$ — efficient control is impossible — operating costs climb.

ALCO Multi-Outlet Thermo Valves assure:

- The refrigerant liquid is accurately metered at the point of expansion to all coil circuits
- Even distribution despite load variations
- Full rated coil capacity—every circuit on the job
- Instant, alert control—no "hunting" or "cycling"
- Higher operating suction pressure—more efficient compressor operation at lower cost

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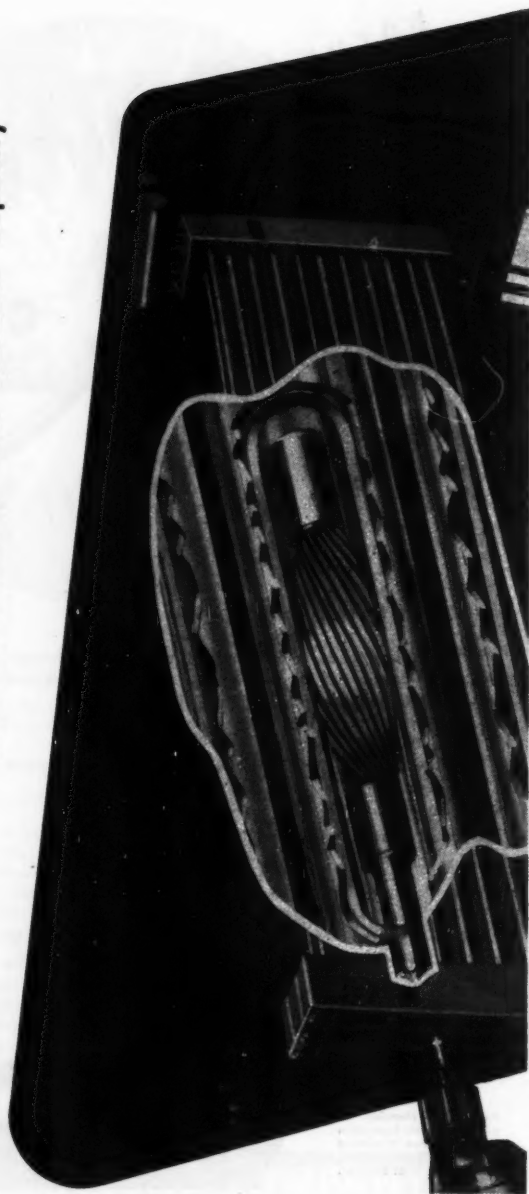
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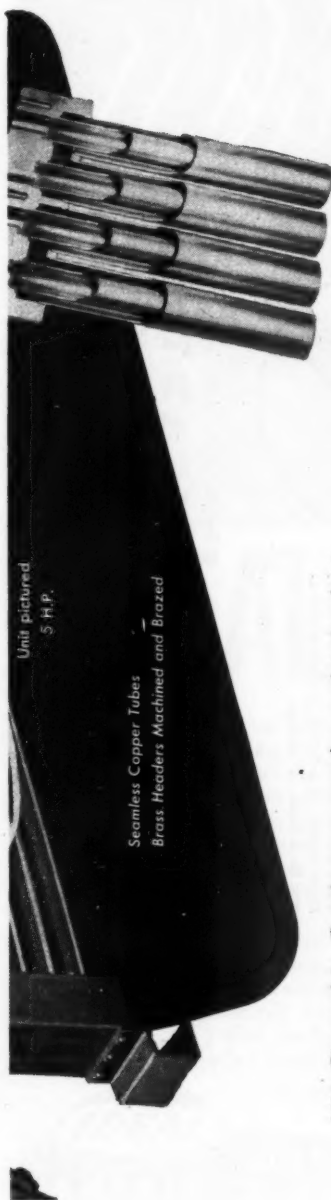
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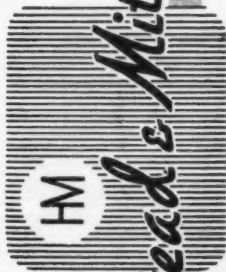


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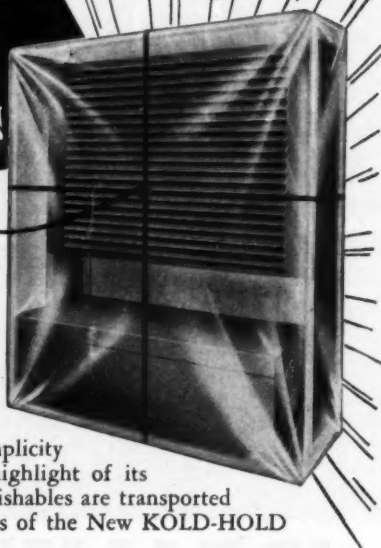
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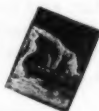
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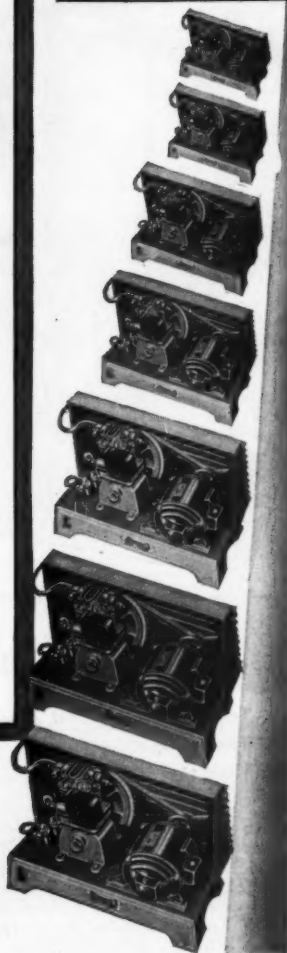
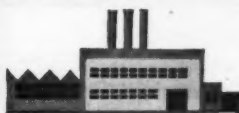
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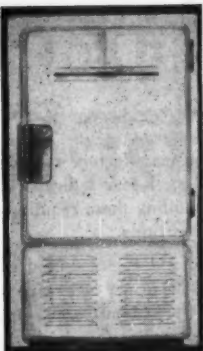
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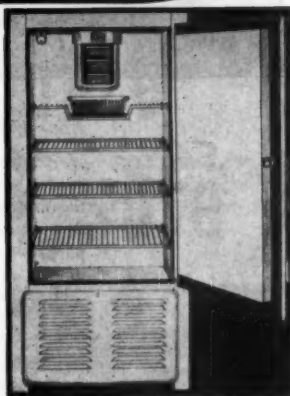
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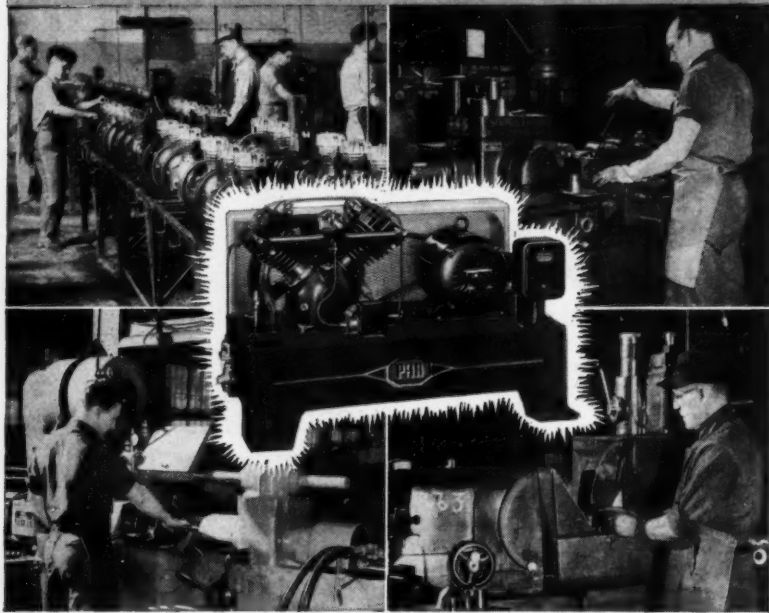
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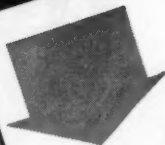
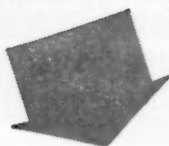
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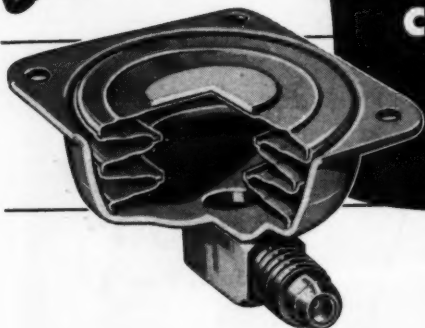
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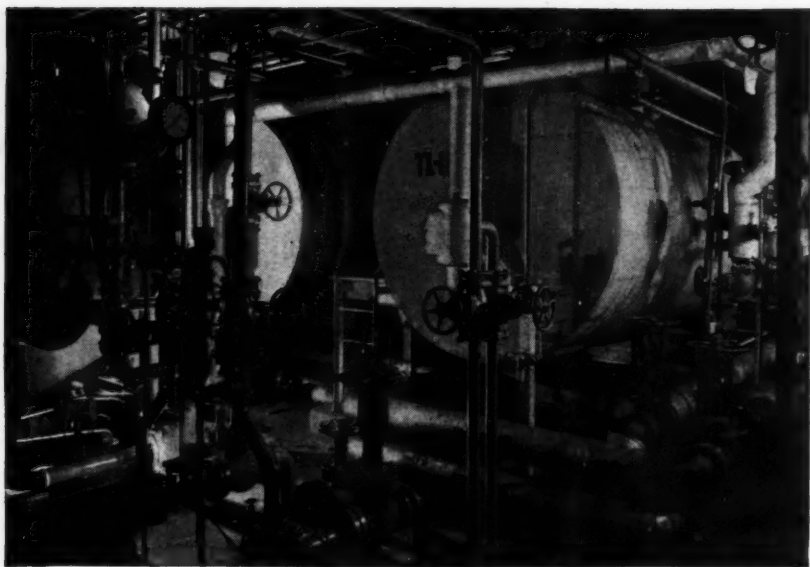
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Vol. 16 AUGUST, 1948 No. 8

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Typical interior view of the Kinetic plant at East Chicago reveals a veritable forest of pipes, valves, gauges, tanks and vats required in the highly complicated manufacture of "Freon."

NOW... 60% more "Freon"... as new Plant Increases Production

The new Kinetic plant manufacturing "Freon" safe refrigerants and propellants at East Chicago, Indiana, is in full operation. Here, technical skill, engineering "know how," and minute-by-minute control of the precision "Freon" syntheses have combined to boost production approximately 60 per cent.

This added production capacity makes available an ample supply of "Freon." No longer will users of these refrigerants have reason for stock piling. There is plenty of "Freon" to meet *every* need.

A steadily growing demand for "Freon" continues to illustrate widespread preference for these quality refrigerants. Most leading manufacturers of air conditioning and refrigerating equipment now use them. They recognize that the exceptional dryness (less than 10 parts of moisture in a million parts of "Freon"!)... plus the uniform purity and quality of "Freon," contribute to the long life and satisfactory performance of their modern, compact units.

That is why more "Freon" is now being used than ever before... and why it became necessary for Kinetic to expand its production facilities. It is also another reason why today cautious buyers of equipment are careful to determine that it utilizes these safe refrigerants. Kinetic Chemicals, Inc., Tenth and Market St., Wilmington 98, Delaware.

➡ The shortage of cylinders continues. "Freon" cannot be shipped without them. Please return empties promptly.



» IN THIS



ISSUE «

THE refrigeration equipment of today demands a very careful selection of the oil to be used. Manufacturers of refrigerating equipment make exhaustive tests to determine the characteristics best suited to their equipment and the serviceman who may at some time find it necessary to replace that oil should have a knowledge of what constitutes a good oil. Hermetically sealed units, low temperature applications, and the Freon refrigerants which mix so thoroughly with oil, place additional demands on it making proper selection more important. For a highly informative article on the subject by an outstanding authority turn to page 33.

THE last part of the article "Installation and Service on the Tecumseh Hermetic Unit" appears on page 38. Taken with permission from the Tecumseh Manual, it provides useful information to the man in the field.

THE calculations necessary in selecting individual room coolers are not much different from those involved in any air conditioning problem, but they can be simplified. Selecting a packaged unit of known capacity is merely a matter of determining whether the load is within that capacity. The article "Selection and Installation of Single Room Coolers" appearing on page 43 provides the short cut method.

CONTRACTORS, dealers and sales people will read with interest "A Report on Franchises" by Julius E. Kovach on page 53. Those service companies who are endeavoring to secure a franchise on nationally known brands of equipment will learn many of the undesirable features and pitfalls of the franchises being offered.

"WHY work so hard," might be the title of an item appearing on page 56 under "Service Pointers." It points out the futility of hard labor in competition with modern machines. We think this is one of the best arguments in favor of modern labor saving equipment we have seen lately.

BUILDING a freezer within a cooler is the subject of a question appearing under Questions and Answers on page 59.

UNDER the title "Shipments of Air Conditioning and Refrigeration Equipment" appearing on page 60 is an analysis and recap of total shipments during 1940, 1944, 1945, 1946 and 1947 together with a report of shipments made during the first quarter of 1948. These are interesting comparable figures issued by the Bureau of Census, Department of Commerce.

A FLOOR plan of the exhibition hall, a tentative educational program and other preliminary information on the regional RSES-REMA conference to be held in Boston in October is contained on page 66.

Cover

OUR front cover this month shows air conditioning units in the process of being assembled at the manufacturer's factory. The units are used for conditioning a fleet of passenger buses running between Chicago and the Pacific coast. Tubular frames on large casters house the units. When installed they can be rolled out of the recess in the side of the bus for easy servicing. Major repairs are taken care of by a quick replacement of the unit, then returning the defective unit for shop rebuilding.



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Selection of Oil for Refrigeration And Air Conditioning Equipment

By DR. EDGAR R. ROSS*

THE selection of the correct lubricating oil for a refrigerant compressor must be governed by several considerations in addition to those applying to compressors in general industrial service.

Besides the type of construction, the interrelation of the working parts of the machine, and the actual conditions encountered in operating and maintaining a refrigerating unit, it is always necessary to consider what happens when oil gets into refrigerant lines. An unsuited oil may congeal on condenser walls, and in evaporators, capillary tubes, and other parts of the system where temperatures are relatively low. This congealing may seriously hamper the transfer of heat and the flow of the refrigerant. It is also very important to know the effect of the newer refrigerants on the various grades of lubricants.

Pour Test

All types of refrigerating equipment used in ice-making or in other industrial refrigerating service, as well as the more complicated electric refrigerators for domestic and commercial service, demand "ice machine oils" of low pour test and low cloud point. The temperature at which an oil becomes hazy because of the precipitation of wax crystals is called the cloud point; the temperature at which an oil ceases to flow under standardized test conditions is called the pour point.

Naphthene-base oils have much lower cloud and pour points than paraffin-base oils. Paraffin-base oils must be dewaxed in the production of suitable oils for refrigerant compressors. Frequently, pour-point depressants are added to these oils to keep the wax in solution. But these compounds do not remove the wax crystals from the oil.

* Chemical Engineer, Industrial Products Department, Sun Oil Company, Philadelphia, Pa.

Obviously, compressor oils refined from naphthene-base crudes with a naturally low pour point have a distinct advantage over paraffin-base oils. It is essential that a refrigerant compressor oil have a pour point lower than the lowest temperature encountered at any point in the system.

Viscosity

Another important physical characteristic to be considered is the viscosity of the oil. It has a direct relation to bearing friction, heat generation, and the rate of oil flow under given conditions of load, speed, and bearing design.

With the increasing use of lower temperature, higher speeds and closer tolerance in refrigerating machines, the careful selection of the oil you use becomes of greater importance. The author of this article is one of our outstanding authorities on the subject of refrigerating oils and, therefore, is well able to outline the characteristics of a good oil. He does just that in this article.

A refrigerant compressor oil should have a sufficiently high viscosity to maintain an effective lubricating film on the bearings, but it should not be too heavy, for this will cause drag, loss of power, and increased cost of operation. Oils that are too viscous will not drain sufficiently from the evaporator coils.

In systems where oil and refrigerant are miscible and soluble in each other, the viscosity of the oil must be high enough so that the diluted oil will still give satisfactory lubrication.

The volatility of an oil should be low

enough to keep it from vaporizing so readily at the discharge temperature and pressure that it is carried over in quantity to the evaporator. It is essential that extreme ranges of viscosity be avoided in so-called "blended" oils.

Demulsibility

In contact with water, the oil should not form a heavy emulsion; to the contrary, it should separate quickly. In other words, it must have good demulsibility, a property which only carefully refined pure mineral oils possess.

Moisture

It is of great importance that the moisture content in refrigerant compressor oils be kept at a minimum.

Oils are generally hygroscopic; that is, they easily absorb moisture from the air. These small traces of water cannot be discerned in the oil, but can be disclosed in a standard test machine by measuring the resistance of the oil to a high tension electric discharge.

A good refrigerant compressor oil should be so strong an insulator that more than 25,000 volts must be applied, under test conditions, before a spark will penetrate the oil. Upon standing exposed to the atmosphere for several hours, this "dielectric strength" can easily drop to 10,000 volts. It is therefore advisable to keep oil containers sealed tightly and to store them in a dry place, especially if the oil is intended to lubricate a compressor handling sulphur dioxide. Obviously, refiners must exercise great care to condition refrigerant compressor oils before sending them to storage, or before loading them into tank cars, drums, and cans.

Conventional filtration or percolation through filter media is not sufficient to remove the last traces of water from the oil. Therefore, subsequent careful conditioning operations must be carried out. The low temperatures involved in any refrigerating system will cause freezing even of small amounts of water in the system, with consequent mechanical difficulties, shutdowns, and repair expenses.

A carefully prepared refrigerant compressor oil should contain not over 10 parts of water per million parts of oil.

Refiners always endeavor to condition compressor oils to the lowest possible moisture content before sending them to storage or before loading. It is recognized that lubricating oils shipped in tank cars pick up moisture from the atmosphere while in transit, regardless of all possible precautions taken by the shippers. Obviously, they cannot assume any responsibility for such unavoidable, although very slight, contamination of the oil on arrival. Manufacturers of refrigerating equipment are fully aware of this, and therefore dehydrate the oil before it is charged into refrigerating units.

Sludge Formation

Refrigerant compressor oils must be refined thoroughly enough to prevent sludge forming reactions with the refrigerants. They must have a very low Conradson carbon test, and must not deposit hard adhesive carbon when exposed to hot spots caused by high temperatures. Here again, naphthene-base oils have the advantage over paraffin-base oils, because they form less carbon than oils made from paraffinic crudes. Moreover, what little carbon is formed is light and fluffy.

Stability

Stability to oxidation and long life of the oil are of extreme importance in the lubrication of hermetically sealed refrigerating equipment. Just "good" lubricating oils, which will give satisfactory service in ammonia and carbon dioxide compressors, will fail when used in sealed systems with sulphur dioxide, or with the newer types of refrigerants.

Lower working temperatures, higher compressor speeds and efficiencies, and the developments of units that require very little maintenance all contributed to the need for long lasting compressor oils. As a consequence, petroleum technologists spent much time in the perfection of new methods of refinement.

Stability to oxidation is of prime importance. When an oil oxidizes, the acidity of the oil is increased and sludge is formed. The original properties of the oil are changed. Carbon residue, coke number, and viscosity are increased. The oil is no longer neutral,

and may become corrosive. Its lubricating efficiency is destroyed.

Although all lubricating oils contain a certain amount of organic acidity, carefully refined naphthene-base oils retain only fractional percentages of acid compounds, which are neither corrosive nor harmful and tend to improve the friction-reducing qualities of the oil.

Efforts to develop inhibitors that retard oxidation have been only partly successful. Since service requirements differ for various oils and affect them differently, these inhibitors may accomplish one purpose, but cause a detrimental effect in another direction. Furthermore, they wear out and lose their usefulness after a certain length of time.

Another attempt to prevent oxidation and prolong the life of oils resulted in the production of very highly refined oils, such as "white oils." Frequently this necessitated over-refining of oils. White oils show an initial high resistance to oxidation and sludging, but they break down rapidly, produce a very detrimental acidity, and form excessive amounts of sludge. Their overall performance will prove, in the end, inferior to that of a specially refined naphthenic refrigerant compressor oil. Naphthenic oils will show a certain sludging tendency sooner than these over-refined oils, but their overall sludging rate is much lower. When they are compared with well-refined pale oils, over-refined oils have a much lower resistance to oxidation, and in use they produce much greater quantities of highly corrosive acids.

Numerous laboratory tests, and carefully observed and checked runs in commercial units over extended periods, have proved beyond doubt that the overall stability and service life of the well-refined naphthenic-base pale oils are far superior to those of the too highly refined white oils.

Copper-Plating

When chlorinated refrigerants are used in a refrigerating unit, an electrolytic action may take place (in the presence of moisture) between the copper in coils, tubing, electric motors, etc. As a consequence, pure copper is deposited on cylinder walls, pistons, valves, bear-

ings, and other parts. This action may cause difficulties in the operation of the compressor. Lubricating oils and refrigerants were at first thought to be the sources of this trouble, but researchers found reason to believe that other factors merited consideration. Extensive investigations in refinery laboratories were therefore carried out in order to find the real cause of copper-plating.

White Oils

Some engineers advocated the use of very highly refined white oils to stop this copper-plating. Special coatings applied by the manufacturers to prevent copper-plating often did not solve the problem, because they were often attacked by the refrigerant or by over-refined oils. Moreover, cracks sometimes developed in the coating and exposed the copper to the electrolytic action in the system.

Results of investigations in Sun laboratories prove that the use of white oils in such cases will not prevent copper-plating. Actually, these too highly refined oils develop more corrosive acids, increase the copper solubility, and therefore have the tendency to promote copper-plating if the other conditions necessary to induce and contribute to this chemical and electrolytic process are present. Copper dissolves slightly in oil, but it is also an established scientific fact that excessive moisture must be present to initiate this process before pure copper is separated and deposited in the system. This has been very forcibly proved, because as soon as efficient dehydrating cartridges were introduced in such refrigerating systems, and well-refined naphthenic pale oils were used for lubrication, the difficulties previously caused by copper-plating virtually disappeared.

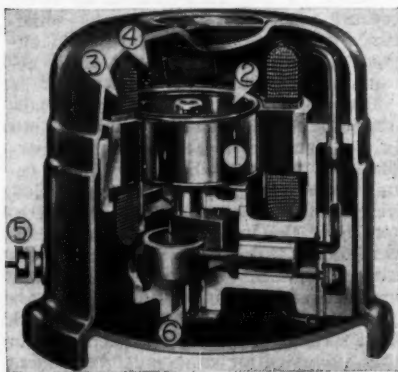
Manufacturers of sealed units cooperated in this endeavor, and are now carefully drying out each system, frequently by baking it, before charging it with refrigerant and lubricating oil. The producers of refrigerants, as well as oil refiners, use every precaution to keep moisture in their products at an absolute minimum.

The flash and fire points of oils used in lubrication of refrigerator compres-

sors are relatively unimportant, because cylinder temperatures in these compressors are usually lower than the cylinder temperatures in air compressors, which require oils with reasonably high flash and fire points. Explosion hazards are very slight. Several of the refrigerants commonly used are nonflammable and have a smothering action on fire.

Effect of Rust-Proofing Processes

Some manufacturers treat or coat the surfaces of some parts to prevent corrosion. Some of these coatings promote deterioration of certain oils, and in some cases they have an inhibitive effect. The most extensively used pale oils are hardly affected by any of the more widely used rust-proofing processes.



In this Kelvinator hermetically sealed unit a definite control over oil foaming is provided for, thus preventing an excess of oil being drawn into the compressor and circulated through the system. When the oil foam rises to the height of the motor rotor (1) the only passage to the upper part of the dome is through the holes (2) in the rotor and through the slight space between rotor and stator. Centrifugal force of the rotor breaks up the foam, separating the oil and refrigerant vapor, permitting the oil to drain back to the oil sump. Vapor is drawn into the compressor through a suction tube from the top of the dome.

Special Characteristics

Only straight mineral oils should be used for the lubrication of refrigerator compressors. Compounded oils should never be used; they react chemically

with some of the refrigerants to form sludge, emulsions, etc.

Compounding with animal or fatty acids raises the pour point and makes the oil very hygroscopic; that is, the oil readily picks up water. Well-refined naphthenic-base pale oils have all of the special characteristics that a modern refrigerator compressor oil must have:

They maintain a good body at fairly high temperatures;

They have good fluidity and form an effective oil film at the lowest temperatures encountered; They do not carbonize when they are exposed to hot spots; They do not leave sticky, waxy deposits at low temperatures; They do not react chemically with any refrigerant; They separate rapidly from the refrigerant; They contain a minimum of moisture, are economical in use, and give prolonged service without change or breakdown.

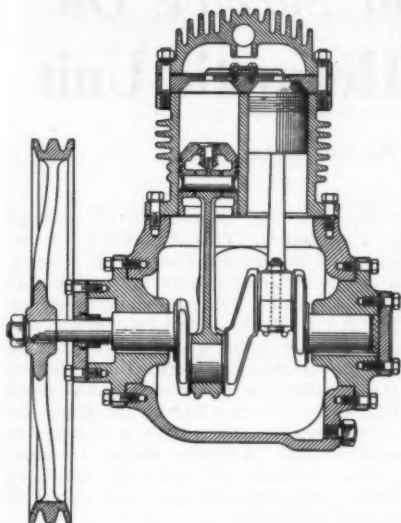
Specifications

The U. S. Government specifies in V.V. -0-581 five grades of refrigerating oils:

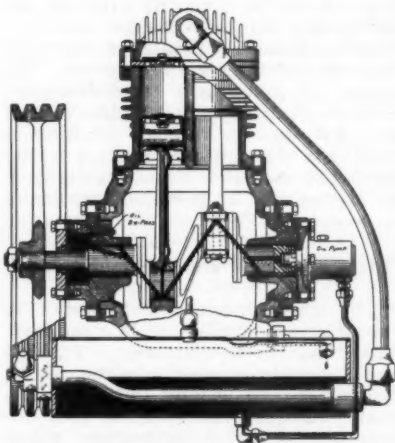
Grade	Via. @ 130 F	Flash (min)	FPour F (max)	Carbon % (max)	Neutral- ization Number
8	70-90	315	-10	0.1	0.1
10	90-120	325	0	0.2	0.1
20	120-145	340	0	0.3	0.1
30	185-205	350	0	0.4	0.1
40	245-280	370	10	0.5	0.1

Lubrication of Domestic and Smaller Commercial Units

Most early model domestic and small commercial units were splash-lubricated, and this system of lubrication, because of its simplicity, is still used on many small reciprocating compressors. But it has one serious drawback: foaming caused by the intermittent release of refrigerant from the crankcase oil. During the "off" cycle, crankcase pressure rises and considerable refrigerant is absorbed by the crankcase oil. As soon as the compressor starts, crankcase pressure decreases, and the refrigerant begins to leave the oil. This rapid release of refrigerant always causes foaming. As a rule, foaming has little effect on efficient operation, but there



This is a typical refrigerating compressor used in small commercial work. It is a splash feed type in which oil is splashed over all moving parts by the connecting rods which dip below the oil level.



Here is a commercial refrigerating compressor with one type of forced feed oil circulation. The oil sump of this compressor is a separate tank below the compressor from which oil is picked up by a small oil pump at the end of the crankshaft and distributed to all moving parts. The oil then drops down by gravity to the base of the compressor and drains back into the sump tank.

is always the danger that the foam level may rise so high that some oil can be taken through an intake valve and discharged into the high pressure side of the system.

When refrigeration engineers realized the seriousness of foaming in some types of small reciprocating compressors, they attempted to eliminate foaming by designing pressure-lubrication systems with oil supply chambers isolated from the rotating and reciprocating parts.

One type of pressure-lubrication system is very similar to the automotive engine lubrication system with a gear pump immersed in the crankcase oil. Since it is located below the oil level, the pump is always supplied with oil. It discharges oil under pressure through small feed lines to the cylinder walls, or through drilled passages to the bearings and other parts to be lubricated. Discharge pressure varies with the speed of the gears. The oil flows by gravity back to the crankcase, where it is picked up and recirculated.

The General Electric design makes use of a rotary pump consisting of two blades moving in a slotted rotor. The oil lifted from the reservoir in the base of the compressor is pumped through a drilled passage in the motor shaft, and through other passages to the yoke and lower shaft bearings. Part of the oil goes to the top bearings and to the cylinder walls. Before returning to the sump, some of the oil flows over the motor windings and cools them.

Another system applies splash lubrication to lubricate the cylinder walls only; a reciprocating pump with a single oscillating member operated from an eccentric on the end of the crankshaft supplies oil to main bearings and, through drilled passageways and tubing, to all other bearings.

As stated previously, lubrication is provided for when the manufacturer charges the unit with the refrigerant and oil before it leaves the factory. Both are expected to give satisfactory service for years.

If any repair or maintenance service is required, the manufacturer or dealer attends to it. Each knows the best type of oil for his particular product. He charges it into the unit after the mechanical repair work is completed.

(To be continued)

Installation and Service On The Tecumseh Hermetic Unit

Continued from the July Issue

Low Sides

THE design of low side for use with the hermetic, follows, in general, all of the sound design principles that are used in any commercial type of low side. The types of low side vary so greatly with different equipment design and type, that an exhaustive treatment of this subject is beyond the scope of this article. There are, however, some fundamental characteristics common to all hermetic low sides that should be followed to secure maximum performance and minimum trouble.

In Fig. 7 we have illustrated typical coiling that has proven satisfactory in a great variety of applications. The coiling may be either serpentine as illustrated or wrap around. It is important to feed from the top. In serpentine coils, each section should return to the top. This construction tends to reduce the total charge of refrigerant and also reduces pressure drop in the coil.

The tube diameter is also important. The size of coil varies, of course, with the unit capacity. It should be large enough to offer little restriction to refrigerant flow (low pressure) drop. However, the velocity must be great enough to carry along any oil that separates from the refrigerant during evaporation and return it to the motor compressor housing. The gas velocity must be relatively high. There must not be any oil traps in the low side.

Parallel refrigerant circuits or plates having multiple channels should be avoided as they tend to oil log.

The thermal conductivity of the coil to the tank should be as nearly perfect as possible. Soldering is the safest method, if the materials can be soldered. There are a number of metallic pastes having nearly the same conductivity as solder that are commonly used. In this construction it is necessary to secure the coil to the tank by straps.

The low side volume should be kept at a minimum. This is necessary to reduce the refrigerant charge. If there is a large charge of refrigerant in the system, the rapid evaporation, during the initial pull down, is apt to overload the motor to the point where it will trip off on the overload several times before the temperature is reduced to the point that the motor can handle the load. To avoid these nuisance trips, a charge not greater than 18 ounces should be used.

The method of applying capillary tubes and high and low side driers is shown in Fig. 7.

Each low side should be leak tested under pressure prior to connection to the hermetic compressor. This is accomplished by connecting the coil to a cylinder of Freon and allowing the pressure to balance. Then raise the pressure to the Underwriters' test requirements with dry nitrogen.

Silver soldering should not be done on a coil containing Freon or oil. Use either soft solder or a flared fitting.

When evacuating a low side, always pull the vacuum through the suction tube, not through the capillary. The flow of air is so slow through a capillary at low vacua that it would take hours to complete.

Installation of the Hermetic Unit

The most important consideration in installing a hermetic unit in a self contained cabinet is ventilation. Through ventilation, from one side of the cabinet to the opposite or front to back, is the best. Adequate unrestricted area for free flow of air is imperative. Never allow external appearance to interfere with correct ventilation.

In fan cooled units, a definite air passage must be provided for with the openings not less than 80% of the face area of the condenser, preferably the full area. It is a distinct advantage to place

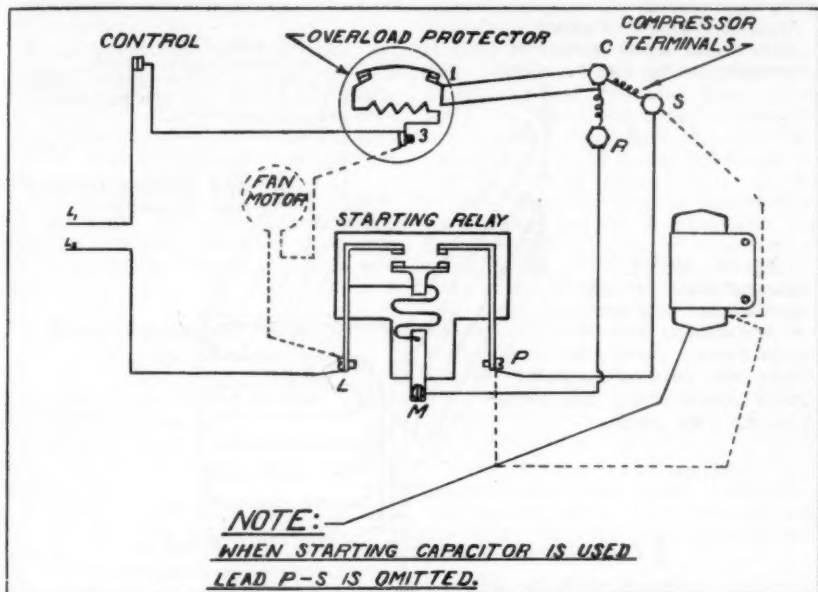


FIG. 6

the condenser at a point where it will be visible. This will insure frequent cleaning. If necessary, provide baffles in the unit compartment so that heated air cannot short circuit back through the condenser.

Static units should be provided with a stack on the back of the cabinet to create a natural draft. This should be the full width of the condenser and approximately 3" deep. The incoming air opening should be unrestricted.

No special mounting provisions are necessary with the Tecumseh hermetic. The single cylinder units are internally spring mounted and exceptionally free from noise and vibration. The twins are externally spring and rubber mounted.

Connecting High and Low Side

The connecting of the high and low side in the cabinet is very important and should be carefully handled. There are a number of ways of doing the job right and local conditions within the plant will dictate which one is to be used. There are also some practices that should be avoided.

First, remember that the motor-compressor, or high side, arrives at your plant with a low moisture content. Therefore, the low side should not be connected and opened to the high side until it has been dried to the same point and filled with dry Freon.

Do not use the compressor as a scrub pump for the low side. See that the rest of the system is swept with Freon before making connections.

The low side should not be evacuated through the gauge fitting on the suction valve. This opens into the compressor dome and will cause foaming of the oil and loss of oil. Also there is danger of contamination of the motor-compressor.

The correct oil charge is put into the motor-compressor at the factory. No addition of oil is necessary when installing the unit.

If it is necessary to change a relay or overload, use only exact replacement. Any other relay or overload will impair performance and may burn out the motor.

The use of liquid dehydrating agents voids the warranty on Tecumseh hermetics. Some, it is true, would not

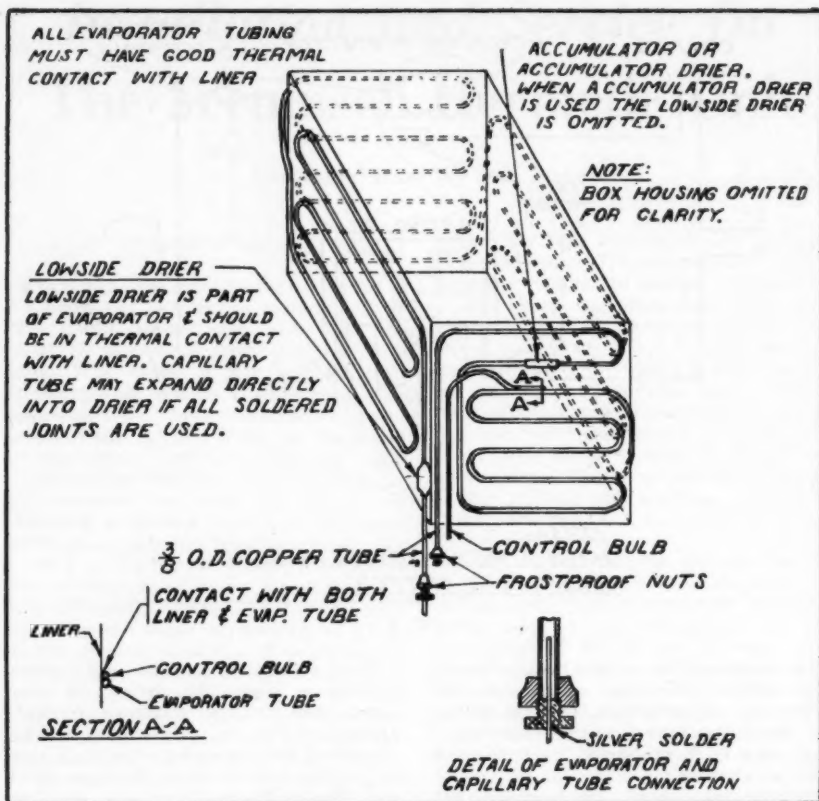


Fig. 7

damage the mechanism. Others, due to their chemical nature, are injurious to the compressor or the motor windings. Adequate dehydration, plus a low side drier, makes the use of liquid antifreeze solutions unnecessary.

Checking Electrical System

The complete electrical system on the Tecumseh hermetic system can be checked completely and thoroughly with an ordinary test lamp as follows: (See Fig. 6)

Unit Plugged In. Test lamp across the following must light:

1. L_1 and L_2 —no light—check power source.
2. L and 3—no light—make sure control contacts are closed.

3. M and 3—no light—relay circuit open, replace relay.

4. M and 1—protector may be tripped off. (wait 10 minutes). If no light, then protector is defective. Replace protector.

Remove Wires from L and 3. Insert test lamp in series with L_1 and 3. Touch L_2 to following points momentarily in sequence listed:

S. No light—open starting winding—replace compressor.

R. No light—open run winding—replace compressor.

P. No light—lead P-S defective (or, if capacitor is used, open capacitor circuit).

M. No light—lead M-R defective.

L. No light—defective relay.

Remove Lead M-R. Test lamp in series with L_1 and 3. If light shows

when L_s is touched to L, relay is defective—replace.

If all above tests prove satisfactory, and there is no capillary restriction, and unit still fails to operate properly, change relay. If good relay fails to correct difficulty, the unit shall be considered inoperative because of internal defects and must be replaced.

NOTE: The new relay will eliminate any faulty electrical characteristics, such as improper pickup or drop out, which cannot be determined with test lamp.

Motor Cycling on Thermal Overload

If motor cycles on the overload, check for the following:

1. Dirty condenser—restricted air flow over unit (air duct opening restricted) or low voltage.

2. Capillary tube restricted or frozen up. If this condition is suspected, pull plug for five (5) minutes allowing time for pressure to equalize (unless capillary is frozen or restricted). Replace plug and observe action. If thermal overload continues to trip off, install gauges and analyze trouble as outlined in the following.

3. Defective starting relay—check as outlined under "Checking Electrical System."

4. Defective thermal overload. If head pressure is not excessive when checked in (2) and compressor shell temperature does not seem excessive, check for defective thermal overload as outlined under "Checking Electrical System."

5. Defective compressor or motor. Check as outlined under "Checking Electrical System."

Pressure Readings

If operating pressures are not normal, the following will be found helpful in analyzing the trouble:

1. Low suction and low head pressure: Indicates an under charge of refrigerant (due to a leak, unless system has been purged).

2. Low suction and high head pressure: Indicates a partial restriction of the capillary tube or strainer. The capillary connecting tube and the capillary tube should be slightly warmer than

room temperature. If they are cold, sweating or frosted, it indicates that the strainer or capillary entrance are partially plugged. If this condition is found, shut off the unit, close (front seat) the liquid valve and disconnect the capillary tube flare nut. Inspect the strainer screen and if it has dirt or flakes of foreign material on it, attempt to clean it off by dipping end of tube into can of carbon tetrachloride and flushing well. It may be necessary to apply Freon gas pressure on suction line (by connecting Freon drum to suction gauge port and opening valve to mid-position) to build up sufficient reserve pressure to blow out screen. If strainer cannot be cleaned, replace with new screen. The capillary, of course, would also have to be changed if it could not be freed of any obstruction.

3. High suction pressure and low head pressures are about equal, it indicates that the compressor is not pumping and the entire hermetic unit must be replaced.

4. High suction and head pressure. This condition could be caused by any of the following reasons:

- (a) Overcharge of refrigerant—see "Recharging System."

- (b) Air in system due to leak in low side or improper service procedure. Air in system takes the space which is normally occupied by Freon. This makes the head pressure and suction pressure run high and results in inefficient operation and an overloaded motor. Under normal conditions, with compressor running, the condenser tubes will be hot at the top and warm at the bottom. With air in the system, the top tubes will be cool or only warm while the bottom ones will be very hot.

To purge air from system, shut off the compressor and remove sealing cap from liquid valve service port. Next, open valve slightly off its back seat and allow mixture of air and Freon to escape for about fifteen seconds. It will probably be necessary to repeat this several times, running the compressor ten minutes or so between purgings, to get all the air out of the system. Inasmuch as some of the refrigerant charge will be lost during the purging operation, check the charge after purging and add Freon if necessary. In extreme cases, where

head pressure does not drop to normal, it may be necessary to pump the entire remaining charge out of the system and recharge. To do this, run the compressor with liquid valve front seated and with liquid valve gauge port open until no more gas is discharged. Replace cap on port before back seating liquid valve. Recharge with new charge.

Recharging System with Freon

1. The refrigerant charge in all capillary tube systems is critical. There is a perfect charge which gives best performance. Any appreciable variation from this charge will affect performance. The correct charge is that quantity of refrigerant which will refrigerate all the evaporator coils and, at the same time, will not cause frosting or sweating of the suction line. The correct charge for any particular system is, of course, determined by the manufacturer of the complete product.

2. Adjusting Freon charge: Unless the system is badly overcharged (suction line frosting badly) do not attempt to adjust the charge until cabinet temperature has pulled down to normal and the unit is cycling regularly. To purge off excess charge, remove liquid valve stem cap and make certain valve is back seated (screw valve in slightly then out to check). Remove cap from service port. With unit running, crack liquid valve off its back seat for a few seconds allowing excess liquid charge to "purge off." Before purging again, melt any frost off suction line with heat from your hand and observe whether it reappears while the unit makes several cycles. CAUTION: Do not purge too rapidly or too much at a time or you may over purge, necessitating, recharging. Each particular fixture or application will have a specific frost line, depending upon low side design, etc.

3. Adding Freon charge: If too much charge is purged off, or if charge has been partially lost due to a leak in system, additional Freon may be added.

CAUTION: Make certain that all lines and fittings, as well as the Freon to be added, are absolutely dry and clean. The presence of an infinitesimal amount of moisture will cause a freeze up.

Extreme care must also be used not to allow any air to enter system. Be-

fore removing cap from suction valve service port, always make certain that the suction valve is back seated because there could be a vacuum in the low side which would draw air and moisture into the system if the valve were not tightly back seated when cap is removed.

Replacing Hermetic Unit

If it has been definitely determined that the hermetic unit (and not the thermal overload, relay or some other part of system) is defective, remove the old unit (complete unit not just the hermetic compressor) as follows:

1. Disconnect unit from power source.
2. Close (front seat) suction and liquid valves on unit.
3. Loosen flare nut on suction line and allow charge to purge out slowly. When only a slight pressure remains, remove suction line and seal immediately with flare plug.
4. Disconnect capillary tube flare nut from unit and seal immediately with flare plug.
5. Cap all valve connections on old unit and remove unit from cabinet.

NOTE: If system is known to be wet, low side will have to be reprocessed in accordance with specifications of manufacturer. New low side drier should also be installed.

6. Check to make certain suction and liquid valves on new unit are front seated, then locate new unit properly in cabinet.

7. Remove plug from capillary tube and connect immediately to liquid valve while gas is being released from tube.

8. Remove plug from suction line and connect immediately to suction valve. Leave nut cracked slightly and do not open suction valve.

9. Crack liquid valve on unit and allow Freon pressure from unit to purge through capillary into coil and out loose suction line flare nut at unit for about thirty (30) seconds. Then tighten flare nut securely, open liquid valve and back seat.

10. Make sure suction gauge port is tightly capped and packing gland nut is tight. Open (back seat) suction valve. Allow unit to run for several minutes and check liquid and suction line connections for leaks.

11. Adjust charge as previously explained.

Selection and Installation Of Single-Room Units

WHEN selecting, selling, installing, or servicing single-room air conditioners, it is important to understand that the air conditioner serves to provide cool comfort—relief from hot and humid weather—not just temperature reduction.

The most successful air conditioner distributors, dealers, salesmen and servicemen are those who realize that healthy comfort cooling is not merely a matter of air temperature reduction, but rather, is the right combination of proper temperature and proper moisture content of the air in the room. Because of possible temperature shock, it is not desirable to hold the inside temperature of an air conditioned room at a fixed temperature regardless of the outside temperature.

Prospective customers for single-room air conditioners for office and home should not be told that they will experience a set degree drop in temperature, or a set percentage of humidity reduction, because these values vary according to factors present at any given time. It is possible, however, to correctly determine the proper size unit or units for installation in any room, and to promise cool comfort.

In some localities the extremes of temperature are much greater in winter than in summer, while in other localities, the opposite condition exists. In the winter, miscellaneous sources of heat, such as the heat from occupants in the room or from the sun, assist the heating unit in warming the air in the room; however, in the summer, these same sources of heat in the room impose a considerable heat load on the cooling system of the air conditioner.

During the summer practically all conditions add up to oppose the reduction of heat content of the air in an air conditioned room. Thus, in the selection of air conditioner models with sufficient cooling capacities to handle the total heat load within a given area, consideration must be given to each one of

those factors which tend to increase the heat content of the air within the room to be air conditioned.

Usually all of the factors tending to increase the heat content of the air rise to their maximum value at nearly the same time. For instance, when a high

This article is taken with permission from the sales and service literature of the Philco Corporation of Philadelphia, Pa. It contains some very pertinent and timely information on the selection of room coolers to fit the job to be done. Both service and salesmen will find this article to be a helpful discussion of the problems presented them.

air temperature causes transmission of large quantities of heat from the outside to the inside of a building, the direct heat from the sun's rays (sun effect) is also likely to be most intense. When the sun's rays are nearly vertical, the greatest amount of heat is received. This explains why it is hotter near the equator than at the poles, and why we receive more heat at noon than in the morning or evening. The effect of the sun shining on the exposed wall of a room has a much greater effect in the southern part of the country than it does in the north.

Often, the presence of additional people and the use of electric lights and appliances in a room occur simultaneously, thus increasing the heat load and raising the cooling requirements of the air conditioner unit.

Heat is not a substance, but is a form of energy, and cannot be measured in pounds or quarts, but must be measured by the effect it produces. In English speaking countries, the unit of heat quantity is the British Thermal Unit

ROOM HEAT-LOAD CALCULATION DATA FOR HUMAN-COMFORT CONDITIONS

Heat Leakage from Outside to Inside of Room		Items to be Multiplied by the proper Multiplying Factor	MULTIPLYING FACTORS (Based on 50% R.H.)			
			NIGHT	DAY		
			Outside, 90° D.B.; Inside, 75° D.B.	Outside, 95° D.B.; Inside, 80° D.B.	Outside, 100° D.B.; Inside, 85° D.B.	Outside, 110° D.B.; Inside, 90° D.B.
Walls Exposed To Outside	North	Sq. Ft. Area	3.3	4.5	6.0	7.0
	South — Shaded	"	3.3	4.5	6.0	7.0
	South — Unshaded	"	3.3	9.0	10.5	12.0
	East	"	3.3	4.5	6.0	7.0
	West — Shaded	"	3.3	4.5	6.0	7.0
	West — Unshaded	"	3.3	12.0	13.5	16.0
Walls in Contact with Ground		"	0	0	0	0
Exposed Glass	North	"	10.1	17.0	22.6	25.0
	South — Shaded	"	10.1	17.0	22.6	25.0
	South — Unshaded	"	10.1	34.0	39.5	46.0
	East	"	10.1	17.0	22.6	26.0
	West — Shaded	"	10.1	17.0	22.6	26.0
	West — Unshaded	"	10.1	45.2	50.8	60.0
Interior Walls		"	3.3	4.5	6.0	7.0
Ceilings	Under Flat Roof	"	3.3	18.0	19.5	23.0
	Under Attic	"	3.3	12.0	13.5	16.0
	Under Finished Rooms	"	2.4	3.6	5.1	6.0
Skylights		"	10.1	38.0	42.0	49.0
Floors	Over Finished Rooms	"	2.4	3.6	5.1	6.0
	Over Basement	"	2.0	3.0	4.5	5.3
	Over Ground	"	0	0	0	0
Heat Generated in Room (Internal Load)						
Outside Air Entering Room		No. of Occupants	169.0	380.0	470.0	640.0
Persons in Room		No. of Occupants	400.0	400.0	400.0	400.0
Lights, radio, etc.		No. of Watts	3.4	3.4	3.4	3.4
Motors in Room		Horse Power	2546.0	2546.0	2546.0	2546.0
Electrical Appliances		No. of Watts	3.4	3.4	3.4	3.4
Gas Apparatus		No. of Burners	1000.0	1000.0	1000.0	1000.0

(Btu.) which represents the quantity of heat required to raise the temperature of one pound of pure water one degree Fahrenheit.

Use of Calculating Table

In the following discussion, all temperature values given are for the Fahrenheit scale. The cooling capacity of a single-room air conditioner generally remains fairly constant with variations of outside weather conditions. Therefore, it is obvious that, to obtain substantially uniform cooling effect, consideration must be given to varying

outside conditions. In the calculating table, "Room Heat-Load Calculation Data for Human-Comfort Conditions", four different temperatures representing outside conditions are given. The column headed "Night" should be used where night occupancy only is to be considered, such as in bedrooms. The other columns of multiplying factors are given for outside daytime conditions of 95, 100, and 110 degrees. When using the table for heat-load calculations for daytime occupancy, select one of the columns with the heading that most nearly fits the outside temperature conditions. If there is any question as to

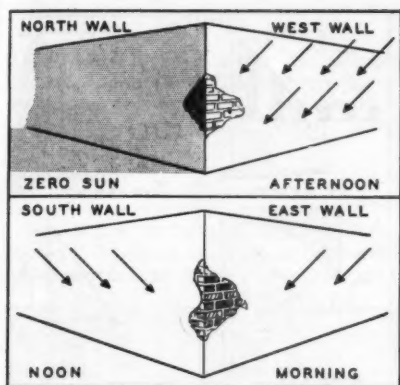


FIG. 1—Sun effects on walls

which column to select, use the one having the higher values.

There are a number of factors affecting the heat load that must be considered in determining the necessary air conditioning capacity needed to provide satisfactory comfort in any particular room. These factors, discussed in the following, are given in the calculating table.

Walls Exposed to Outside

The direction that the outer walls face is a very important factor in determining the amount of heat transfer from the outside to the inside of a building. See Fig. 1.

The least amount of heat transfer through the walls of a building occurs on the north, because in the northern hemisphere, the sun's rays seldom reach this side. East exposures afford but little additional increase in heat leak because the sun's rays leave this side of the building before the maximum

heat of the day is reached.

South walls are exposed to the sun in the late morning and early afternoon hours when the sunshine is more intense, resulting in an increase in heat transfer into the room. Maximum heat transfer occurs through walls on the west side that are exposed to the afternoon sun.

Construction Material

The construction material in the walls is also an important factor effecting heat transfer into a room. Except during prolonged, excessively hot weather, a wall constructed of heavy stone allows little heat transfer from the outside to the inside, regardless of its position in the building. However, if the wall is of thin frame construction, facing west, it will transfer much of the heat from the sun to the inside of the room. Although, in the calculating table, the multiplying factors are based on a 12" brick wall, this table will give a basis for estimating the heat transfer for other types of walls.

Note: When calculating the heat load of an outside wall, a more accurate estimate of the total heat load may be made by deducting the area of the windows from that of the wall, since the effect of exposed glass is computed separately in the calculating table.

Shaded Outside Walls

Shaded walls have a leakage factor much lower than those exposed to the direct rays of the sun. Trees or adjacent buildings often cut off the sun's rays in the afternoon, thereby decreasing the heat transfer through the walls. The extent of building shading, as shown in Fig. 2, is a matter that should be con-

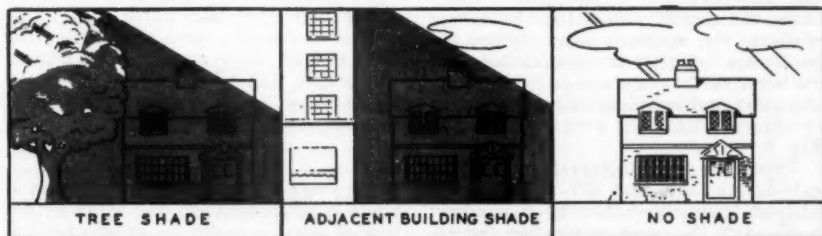


FIG. 2—Effect of shading

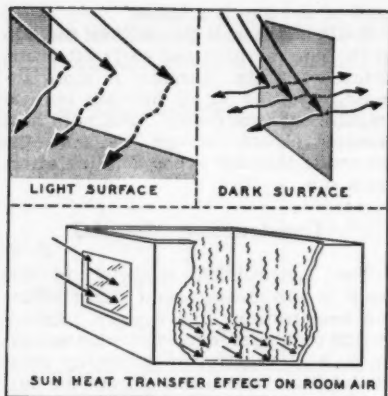


Fig. 3—Effect of sun heat.

sidered individually for each installation.

In the calculating table, a shaded west wall has a multiplying factor of 4.5 (Btu. per square foot per hour) for a 95 degree outside temperature. Under the same outside conditions an unshaded west wall has a multiplying factor of 12, or a little more than two and one-half times the heat transfer through a shaded wall.

Walls in Contact with Ground

This item in the table means that only the portion of basement walls above the ground need be considered when making heat load calculations.

Exposed Glass

The amount of heat that is transferred from the outside to the inside through windows is relatively large. Although the windows ordinarily cover only a small percentage of the total wall surface in which they are located, in many cases, the greater part of the heat enters through the window area. When the sun's rays fall on a window surface, the radiant heat from the sun passes through the glass and increases the temperature of objects within the area, as shown in Fig. 3.

There are two factors given in the calculating table that affect the amount of heat transmitted through a window; the first is the window location (north, east, south or west wall), and the sec-

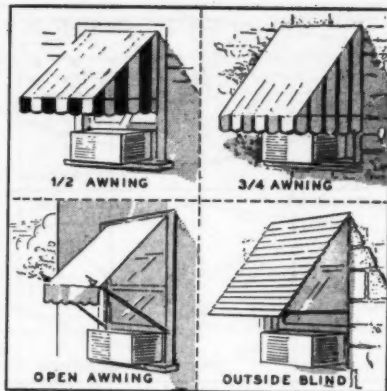


Fig. 4—Types of awnings.

ond, whether or not it is shaded. The only factor subject to control is shading; if a window has an awning, or is completely shaded by trees or other buildings, the amount of heat entering the room will be considerably less.

The type of awning installed is of considerable importance, especially an awning covering a window where an air conditioner is installed. Three-quarter awnings without openings in the upper part of the sides tend to retard the free flow of air from the conditioner (see Fig. 4). When this type of awning is used, ports covered with flaps can be installed in the upper portion of the sides, to provide for the escape of trapped air. It is advisable to place awnings over all glass areas facing the south or west; in many cases, such awnings will permit the use of smaller capacity air conditioning equipment. Ordinary roll blinds or Venetian blinds on the inside of the window retard heat transfer into the room but these are not as effective as awnings.

The best combination for preventing heat from entering through the window is an outside awning, plus inside blinds, and drapes that may be drawn to cover the window when the sun's rays are intense. See Fig. 5.

Interior Walls

The heat leakage factor for interior walls is approximately the same as for shaded outside walls, as shown by the calculating table.

Ceilings

The heat leakage factor for ceilings depends upon the nature of the space above the ceiling; that is, whether it is under a flat roof (uninsulated), attic, or a finished room.

Skylights

Because a skylight is located in the roof of a building, it generally transmits much more heat than a window in a

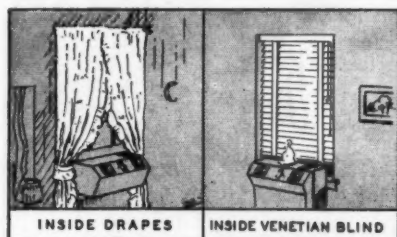


Fig. 5—Inside drapes and blinds.

vertical wall. The average value of heat transfer per square foot through a skylight is given in the calculating table.

Floors

The nature of the space underneath a floor determines the amount of heat that will enter a conditioned space from below. The calculating table shows that most heat will enter through a floor over a finished room, less heat will be transferred when the floor is over a basement, and practically none when the room is over the ground.

Internal Load

The internal heat load in a room depends upon several factors, as discussed in the following:

Air Intake

Warm air that enters a conditioned space is a source of added heat and moisture. Such air, entering the room through the cracks around doors and windows, or brought in through the air conditioning unit, is at outside temperature and moisture content. It is essential that the temperature and moisture

content of the incoming air be reduced, in order to maintain the required inside conditions.

Proper ventilation in an air conditioned space requires the introduction of a certain quantity of outside air; the minimum amount required is 10 cubic feet per minute per person, and the multiplying factor in the calculating table is based on this value. When determining the heat introduced into a room by outside air, multiply the factor given by the number of occupants. The pertinent fact about ventilation, as far as heat load is concerned, is that the introduction of larger quantities of outside air into the conditioned space creates a greater load on the conditioner cooling unit.

Number of Persons in the Room

Each person occupying an air conditioned room adds heat load that uses up some of the capacity of the air conditioner. The number of people should be based upon the number expected during the cooling season. The average value given in the calculating table shows that each person adds 400 Btu. to the heat load every hour.

Lights

Since all electric lamps are rated in watts, it is an easy matter to determine their heat load. Add the wattage of all lights used and multiply the result by 3.4, since one watt is equivalent to 3.4 Btu. per hour.

Other Sources of Heat Generated in the Room

In this section of the calculating table, other sources of heat such as electric motors, electrical appliances and gas apparatus are listed. These items will not ordinarily be required for calculating the cooling capacity of rooms in dwellings, but may be encountered in some business establishments or professional offices.

Electric Motors

An electric motor operating in the conditioned space may add 2546 Btu. per hp. per hour to the air conditioner

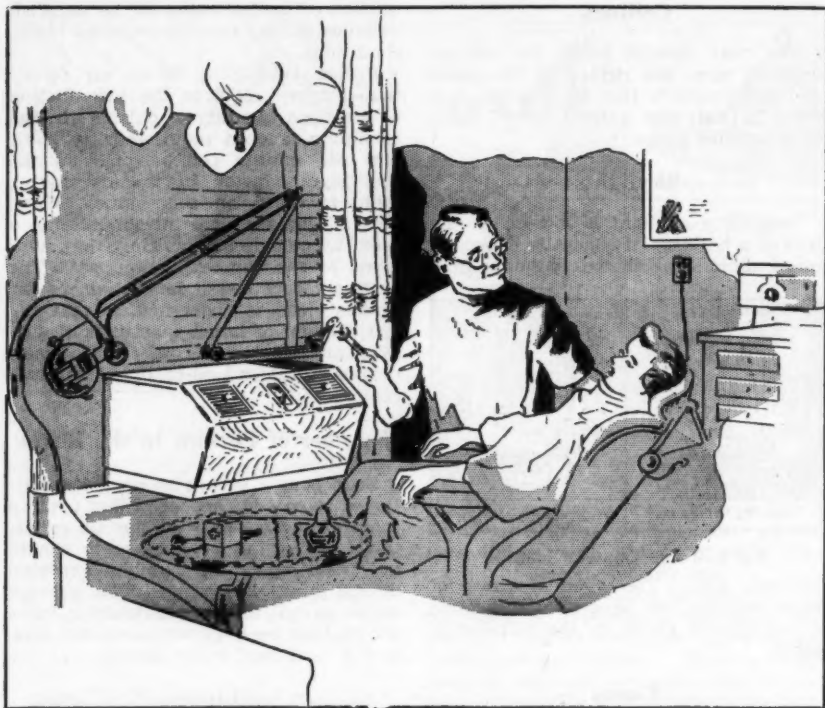


Fig. 6—Dental office equipment

load (this figure is for one horsepower; for motors of higher or lower rating, use a proportionate value).

Electrical Appliances

It is generally possible to estimate the heat generated by toasters, hot plates, etc., by referring to the wattage rating on the name plate. The multiplying factor is 3.4, the same as for electric lights.

Gas Apparatus

An estimate of heat generated by gas operated apparatus such as medical sterilizers, may be made by counting the burners and multiplying the total number by 1000.

In general it is impractical to operate an exhaust or supply fan in a room to be conditioned by a fractional horsepower air conditioner, because of the relatively

large resultant heat load imposed by the introduction of outside air handled by such fans. An exhaust fan of a given cfm. capacity imposes the same heat load as a supply fan of the same capacity, since the amount of air pumped out of the room must obviously be replaced by the same amount of outside air entering the room through cracks under the door and around the windows. An indication of the amount of heat load that would be added to a room by the operation of an exhaust or supply fan is apparent from the following example:

Assume an outside temperature of 95 degrees, and an 8 inch diameter four-blade fan operated by a 1725 rpm. motor. The air handled by such a fan would be approximately 500 cfm. The heat load resulting from the introduction of 500 cfm. would be approximately 9900 Btu. This load alone would require the total cooling capacity of a $\frac{3}{4}$ hp. console unit! Exhaust and supply fans are gen-

erally larger than 8" diameter and therefore would impose still greater heat load on the room to be conditioned.

Since diners are usually equipped with exhaust fans in the hood over the cooking equipment to remove cooking odors as well as heat, it is considered impractical to install fractional horsepower air conditioners in such establishments.

Professional Offices

When making an air conditioning survey of professional offices, such as the dental office illustrated in Fig. 6, be sure that all heat producing equipment is included. Such equipment ordinarily includes a steam-electric sterilizer, bunsen burner, an electric motor to operate the drill, and one or more heating elements.

Multiple Installation of Single-Room Air Conditioners

The use of more than one single-room air conditioner in a large room or office is advisable when the calculated load is over 9000 Btu., or where flexi-

bility of operation is desired. An installation of this type, shown in Fig. 7, tends to provide economy of operation, because all of the units need not be used at the same time. In the morning hours, or on days when the sun effect is less intense, it may not be necessary to operate all the units.

The heat load for an office with large glass exposures presents a problem in occupancy and shading. When computing the heat load due to the number of people in an office of this type, it is a good idea to count the total number of chairs; this total should be used as the estimated occupancy. Since large unshaded windows that are exposed to the south or west add greatly to the heat load within the room, the installation of outside awnings should be recommended. The next best provision would be the use of Venetian blinds or some similar type of shading on the inside. Without some kind of shading for windows facing the south or west, the required cooling capacity will be greatly increased, and the radiant heat entering through the glass will cause discomfort to the occupants.

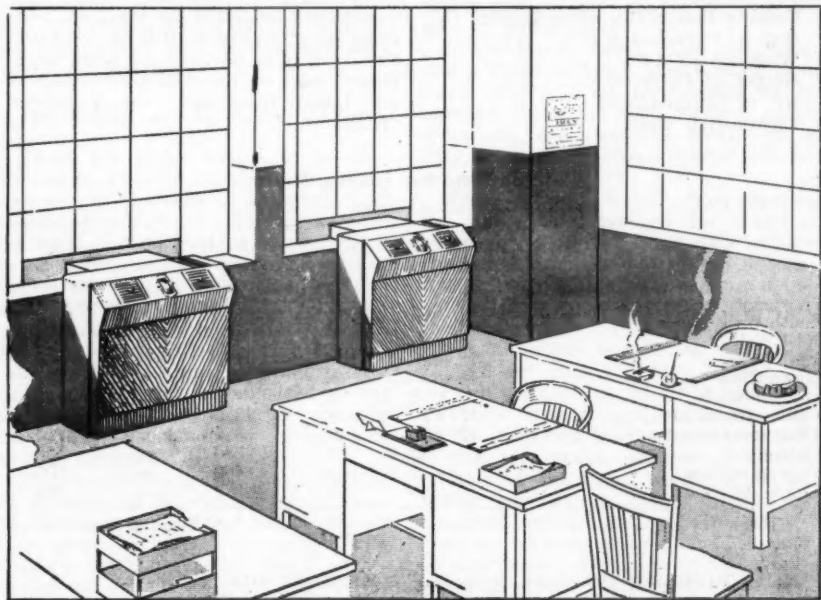


Fig. 7—Multiple installation of console models.

Estimating and Calculating Room Heat Loads

The calculating table provides sufficient information for making accurate estimates of the heat load of a room in Btu. per hour, that an air conditioning unit will be required to handle. Selection of the unit can then be made from the Btu. rating of each model air conditioner.

The heat load calculation for any space to be conditioned may include all of the items previously outlined. For this reason it is necessary to systematically tabulate all of the factors which contribute to the heat gain within the space. The use of the calculating table insures a quick and accurate estimate, by reducing the possibility of errors and omissions.

In order to illustrate the application of the heat load calculating table, a typical house with a tree shading its western exposure (see Fig. 8) is used as an example. To assist in making the sample calculations given, a cutaway view of the house is shown in Fig. 9.

Sample calculation for the living room shown in Fig 9:

Outside temperature—95 degrees
Size of room—12' x 20'
Windows—3' x 6'
Height of Ceiling—8'
No. of Occupants—2
Lights—100 watts

If this had been done, the computed heat load would have been 8997 Btu.

From the calculations above, the total heat removal load for the living room, at 95 degree outside temperature, is approximately equal to the capacity of a model rated at 9000 Btu. per hour. This model may be installed with the assurance of comfort cooling when the outside temperature is not over 95 degrees.

If the calculation for this living room had been made for 100 degree outside temperature, the total heat load would have been about 10,500 Btu. instead of 9240. This amount of heat removal would necessitate the installation of two window models of 5250 Btu. each. If the calculation had been made for 110 degree outside, the total heat removal load would have been approximately 12,700 Btu., which would require the installation of one 5250 Btu. model and one 7750 Btu. model. These comparative figures are given to show that the selection of proper model or models to satisfactorily air condition a room depends, to a large extent, on outside temperature conditions. Another important variable factor is the number of persons occupying the conditioned space.

Sample calculation for the front bedroom shown in Fig. 9: It is assumed that the room is to be used for night occupancy only, so the multiplying factors are taken from the column headed "Night."

Calculations for Living Room

	Items to be multiplied by factor		Multiplying factor		Cooling load Btu. per hour
South Wall—unshaded.....	8' x 20'	×	9	=	1440
East Wall.....	8' x 12'	×	4.5	=	432
East Glass.....	18 sq. ft.	×	17.0	=	306
South Glass—shaded.....	18 sq. ft.	×	17.0	=	306
Interior Walls.....	32' x 8'	×	4.5	=	1152
Ceiling (under attic).....	13' x 20'	×	12.0	=	3120
Floor (over basement).....	12' x 20'	×	3.0	=	720
Outside air.....	2'	×	380	=	760
Persons in Room.....	2	×	400	=	800
Lights (60 watts).....	60	×	3.4	=	204
Total.....					Btu. per hour 9240

Note: To simplify the above example, the sq. ft. area of the two windows was not deducted from the outer wall area.

Room—11' x 13'
Windows—3' x 6'
Ceiling—8 ft. high

Outside temperature—90 degrees
No. of people—2
Lights—100 watts

Models provided with room-air intakes in the back or ends should be located at a minimum of six inches from

Calculations for Front Bedroom

	Items to be multiplied by multiplying factor		Multiplying factor		Cooling load Btu. per hour
Walls Exposed to Outside					
South—unshaded.....	11' x 8'	×	3.3	=	290
West—shaded.....	13' x 8'	×	3.3	=	343
Exposed Glass—shaded.....	36 sq. ft.	×	10.1	=	364
Interior Walls.....	24' x 8'	×	3.3	=	634
Ceiling (under attic).....	11' x 13'	×	3.3	=	472
Floor (over basement).....	11' x 13'	×	2.0	=	286
Outside Air.....	2'	×	169	=	338
Persons in Room.....	2	×	400	=	800
Lights (100 watts).....	100	×	3.4	=	340
Total.....					Btu. per hour 3867

Install a model rated at 5250 Btu. per hour.

If it were desired to condition this same room for day occupancy, for 95 degree outside temperature the heat removal load would be 6781 Btu. per hour, which would require the installation of a conditioner of greater capacity. A model rated at 7750 Btu. per hour would do the job.

Installing the Air Conditioner

There are many factors to be considered in selecting the point of installation of a single-room air conditioner. If these factors are not carefully weighed before the actual installation is made, it is very probable that the purchaser will never receive complete satisfaction from a faultlessly-performing air conditioner.

Two much-neglected details are: instructing the purchaser in correct operating procedure, and explaining to him exactly what may be expected of his air conditioner. The latter obviates numerous call-backs on normally functioning equipment.

Models providing for the directing of conditioned air toward the ceiling should be so placed that the cooled air falls from the ceiling, by natural circulation, over the point where conditioned air is most desired. However, this cooled air should not fall too close to the conditioner.

the nearest wall and from any article of furniture, thus permitting a clear air passage to these intakes.

The purchaser should be cautioned to place no article over or against the conditioner in such manner that it restricts free air passage for any air intake or outlet grille.

Grilles should never be so positioned that a room occupant is subjected to a direct draft. If the conditioned air is directed above the head level of room occupants, and descends gently, at a very low velocity, "head drafts" will be avoided.

When installing water-cooled models, the above considerations for insuring proper air circulation are doubly important, since once the water lines are installed, considerable more expense is involved in making corrective location changes.

One attendant installation danger is a short-circuited air path. This will occur if the conditioned air is permitted to follow a short path, from the discharge point into the room directly back to the air intake, without spreading throughout the room. Such an undesirable condition might be caused by incorrect installation or where obstructions are located in the path of normal air circulation. This type of mal-circulation is often experienced where two or more air conditioners are placed close together, so that short local circulation



Fig. 8—Typical house.

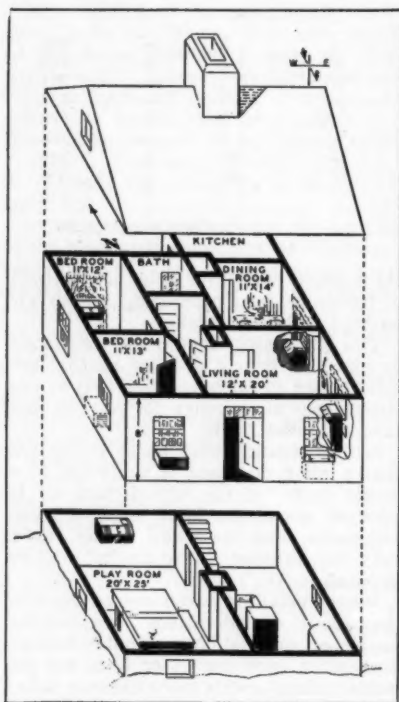


Fig. 9—Cutaway view of typical house.

takes place between the units, instead of a normal circulation of conditioned air, throughout the room, from each unit.

Another "must" for most efficient operation is that all windows of the air conditioned room be kept closed, and doors opened no oftener than necessary. Where a door opens into a hot hall or staircase, such as might be encountered on top floors of flat-roof office buildings, it will be found advantageous to ventilate the hall or staircase.

It will prove economical, and will greatly assist the air conditioning, if all windows are sealed against the infiltration of outside air, with its heat and dirt. Irrespective of the air conditioner capacity, it is impractical to attempt to reduce temperature and humidity in a room if an excessive amount of air is permitted to enter.

A great amount of heat is transmitted through window glass. Awnings should be installed where the sun strikes the windows directly for any great length of time during the day.

The insulation of walls, floors and ceiling contributes greatly to the retention of conditioned room air in the summer and heating plant warm air in the winter. Ceilings of flat-roof buildings are exposed to, and admit, large quantities of heat, thus creating greater load on the air conditioner. In such cases, the need for insulation should be stressed to the air conditioner user.

It is always preferable to install the conditioner in the coolest wall available. The order of preference of wall location normally is: north wall, east wall, south wall, and west wall.

Console models are designed to produce their rated cooling effect with the standard duct assembly supplied. However, if longer straight ducts are necessary, they should be insulated and their length limited to the values shown in the accompanying table.

Max Temperature of Air to Condenser (°F.)	Max. Length of Straight Duct (in feet)
110	2
105	3
100	4
95	6
90	8

Too much emphasis cannot be placed upon the importance of proper installation of both the window and console types. When installing window models, the cradle, with its associated supports, must be securely fastened to the window sill, and must be sufficiently rigid to eliminate vibration and consequent disturbing noise. An airtight window seal is imperative; for window models, the seal should extend around the entire unit, and for console models, around the window duct.

A Report on Franchises

Presented before the NERA Mid-year Leadership Conference at Chicago, Ill. in July

By JULIUS E. KOVACH*

IN down-to-earth American language it has long been said, "If you build a better mousetrap, the world will beat a path to your door." The NERA Committee on Franchises believes this principle holds true in the appliance-radio business as well as all other industries. More particularly, we believe that the manufacturer and distributor who develops a better franchise will find consumers beating a path to their dealer's door. This can only result in more sales and more profit for all concerned. With this thought in mind, my Committee has worked long and hard to prepare this report on franchises for your consideration.

During the past six months the need for franchise improvement has indeed come home to roost. We have found that increased production has not solved our problem as it was thought six months ago it would. We still have with us, and more acutely so, such evils as price-cutting, special deals, gray markets, over-franchising, high costs and a companion high dealer mortality rate. Now more than ever, it is apparent there is a need for "an ample market for every dealer and a fully competent dealer for every market."

Over-Franchising

We appreciate the fact that many manufacturers do not control the number of dealers a distributor may appoint. We also realize that many dealers took on extra lines when merchandise was hard to get and that they are now beginning to look over their lines and cut down the number they are going to carry in the future.

However, an interesting franchise picture was developed from a survey of dealers in a city of 125,000, which

brought out the seriousness of the over-franchising question. We found that one appliance manufacturer had as many as 46 individual outlets for a line of freezer and refrigeration products. Another manufacturer of laundry equipment had 45 outlets. There were 37 dealers for a line of water heaters, and 26 dealers for one line of ranges. And the situation in radios was even worse. Obviously no one manufacturer can possibly spread his line so thin in a territory this small. Two major manufacturers—one with two dealers and one with three dealers—were and are unquestionably getting their full share of business in this city. The other examples are typical, however, of the over-population of dealers with too many lines for their own good and manufacturers with too many dealers for the good of their line.

This vicious circle was further brought out by the result of Electrical Dealer magazine's third Kalamazoo study. The editors reported in the May issue that "where one dealer fell, another arose to take his place." The magazine pointed out that "some franchises come cheap," and their report showed the need for screening future newcomers. Said the article, "As the competitive phase of retailing arrives there are few veteran dealers in the county, as elsewhere, who do not believe that the entire industry would prosper more with fewer retail outlets."

Surely such conclusive evidence substantiates our recommendation that manufacturers limit the number of franchised dealers to one dealer for each 50,000 population. We further recommend that before a new dealer is appointed, existing dealers be advised and consulted.

In this connection, we would further like to emphasize to all manufacturers that the dealer mortality rate for those manufacturers who do have a good franchise is much lower than for those

*Paramount Good Housekeeping Shop, Racine Wis. Chairman, NERA Committee on Franchises.

manufacturers whose franchise is not as good as it should be. My committee would also like to point out that some exceptionally good franchises would be better franchises if properly policed by distributors. A dealer alone cannot make his franchise valuable, even though it may be printed in gold ink on fine parchment and bound in the best of leather. Neither can a distributor nor a manufacturer single-handedly make a franchise valuable. It is a three-way deal which requires all three to work together in close harmony, with each having full understanding as to the other's individual responsibility.

Part of this understanding involves an appreciation of the dealer's costs of doing business. It is necessary for dealers to have protection if they are to profitably promote any given line of appliances or radios. For instance, we have one NERA member who does an outstanding volume. Because of this volume he can afford better salesmen, which results in more sales effort. While he is the only franchised dealer for the line in a city of 40,000, his manufacturer and distributor have seen fit to realize his superior rating. If he had not had this protection, he would never have been able to register his last year's volume of 500 refrigeration units. If his territory were split with other dealers, naturally he would lack incentive to push the line. It is also well to point out, any manufacturer will find it hard to locate three other dealers to do the same high-quality job.

In suggesting such franchise improvements, it is our hope to gain for the appliance-radio dealer and the entire appliance-radio industry a higher respect for our industry. Such respect is already enjoyed by other industries. The automobile industry affords a good example. In a city such as my hometown—Racine, Wisconsin—for instance, there is one Buick dealer and one Chevrolet dealer. These automobile dealers have identified themselves with the names they handle and have built up respect in our community as experts for their lines. However, in the appliance industry, there are today so many dealers selling individual lines of products, few if any can do an equally creditable job of building public confidence.

We believe that what helps the dealer

also helps the manufacturer and the distributor. To put this thought across, the NERA Committee on Franchises originally had in mind drawing up a model franchise to present to you. However, after due consideration, we decided it was more appropriate to give you suggested provisions which dealers would like to see in all franchises.

Provisions for Franchise Improvement

The Company and Dealer mutually covenant and agree that this Franchise Agreement shall be binding upon each of them in all its particulars. If either party shall willfully violate any of the covenants herein or any of the duties imposed upon it by this agreement, such willful violation shall entitle the other party to terminate this agreement, provided that the party desiring to terminate for such cause shall have given the offending party at least thirty (30) days' written notice if the franchise has been in force not more than two (2) years, sixty (60) days' written notice if the franchise has been in force from two (2) to three (3) years, ninety (90) days' written notice if the franchise has been in force from three (3) to five (5) years, and six (6) months' written notice if the franchise has been in force more than five (5) years. Such written notice shall specify the particulars wherein it is claimed there has been a violation. If, at the end of such time the party notified has not remedied the cause of complaint, then the termination of this agreement shall be deemed complete.

The Company agrees that it will not ship on consignment or in any manner sell any of the products enumerated herein to any person or agent unless said person or agent shall have applied for and been issued a Retail Franchise; nor shall it ship on consignment or in any manner sell such products to any franchised Dealer for resale in other areas than the area in which the said Dealer is franchised to operate under the terms of its Franchise Agreement. If any sale of such products is made by the Company to any person or agent which is not so franchised or to any franchised Dealer for resale outside the area in which the latter is franchised to oper-

ate, the Company shall pay to the duly franchised Dealer in the area in which said sale occurs the full mark-up on the products so sold when the said Dealer discovers the sale.

The Company agrees that it will not issue any franchise to any Dealer unless said Dealer shall maintain an adequate service department or, in lieu thereof, shall have contracted with outside agents to furnish the necessary service facilities in the franchised area.

The Dealer agrees to carry on hand at all times a reasonable stock of replacement parts for the products enumerated herein, as measured by the volume of business transacted.

The Company, on its part, agrees to carry on hand at all times a sufficient stock of replacement parts to meet the requirements of the duly franchised Dealer or Dealers in the franchised area.

The Dealer will provide facilities for rendering service on products sold by it or sold from outside the franchised area into the area and will assume all responsibilities for carrying out the manufacturer's guarantee or warranty thereon and for maintaining such products in good operating condition as judged by the standards of the Company. The Dealer shall investigate all requests under manufacturer's guarantees for free replacement parts which appear in any way to be abnormal, with a view to (1) avoiding abuse of manufacturer's guarantees by the Dealer's customers, and (2) advising the Company of any abnormal defects in the products which may require correction in manufacture. The Dealer will not order any free replacement parts under manufacturer's guarantee which it is not satisfied are proper under the guarantees.

Since the servicing of any products (other than small appliances, fans, vacuum cleaners, electric bed coverings and milk coolers) sold by the Dealer outside the franchised area will of necessity have to be provided for by the Company, and since the suggested retail price therefore includes provision for the cost of such servicing during the period of the guarantee, the Dealer will pay to the Company, in respect of any such products (other than small appliances, fans, vacuum cleaners, electric bed coverings, and milk coolers) sold by it outside the franchised area, an

amount equal to fifteen per cent (15%) of the suggested retail price of such products to cover the cost of such servicing.

The Company agrees to furnish to the Dealer at least ninety (90) days' notice prior to the announcement of any of the following:

- (a) New models of the enumerated products;
- (b) Price changes relating to either old or new models of the enumerated products; and

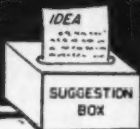
The Company further agrees to give to the Dealer a reasonable opportunity to purchase factory overstock and to credit the Dealer for the stock of the enumerated products held by the Dealer at the time the price change goes into effect or the new models are ready for delivery.

The Company agrees that it will maintain a program of supervision and instruction for the benefit of the Dealer for the purpose of advising, assisting, and instructing the Dealer in the use of the most effective merchandising technique, advertising, and advertising aids, which are acceptable to the Dealers.

The Dealer agrees that it will purchase and carry on hand at all times an adequate display of stock of the products enumerated herein, as measured by the customary trade of the said Dealer, if such merchandise is available, but the Dealer can only buy the type of products enumerated in the franchise.

The Dealer agrees that, in the event of the cancellation or termination of this Franchise Agreement or in the event that said Dealer for any reason ceases to do business, the Company shall have, for a period of fifteen (15) days from and after the date of said cancellation, termination, or cessation of business, the option to repurchase any or all of the new, used, or repossessed models of the enumerated products owned by the Dealer on that date at the prices currently prevailing for such products. The Dealer agrees not to sell or offer for sale, except at regular retail prices, any of the enumerated products to anyone else during such option period without written permission of the Company and, if requested by the Company, to assemble at the Dealer's place of business all the models of the enumerated products owned by him on that date.

SERVICE



POINTERS

A department for the exchange of ideas on new devices and methods of improving service work. Five dollars is paid for each pointer published. Write up your idea today and mail it to the Service Pointer Editor.

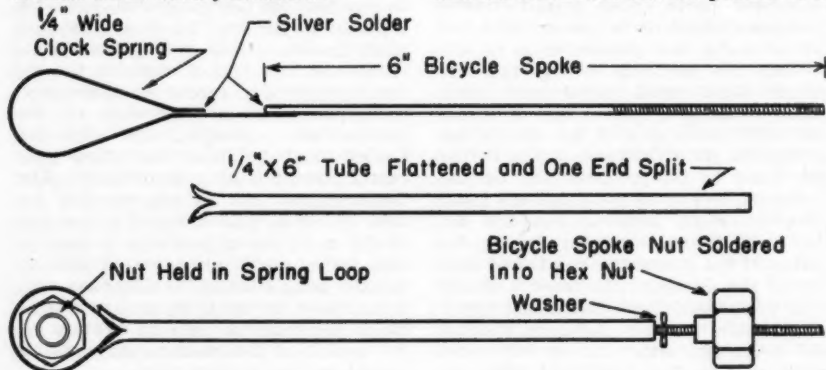
CHECKING OIL LEVEL

WHEN checking the oil in a compressor, most men will use their screwdriver and after putting it down in the compressor body, will strain their eyes trying to see where the oil level came on the screwdriver. This can be eliminated by taking a small piece of soapstone and marking the screwdriver full length. When you take the screwdriver out you will find that the soapstone has disappeared up to the point of the oil level. One thin continuous line on the screwdriver is sufficient, and the small amount of soapstone left in the oil will have no effect.—Submitted by Bob Nicholas, Okmulgee, Okla.

★ ★ ★

TOOL HOLDS NUTS IN RESTRICTED SPACE

HERE is a gimmick which I made to handle the removal or starting of nuts in places inaccessible to the hands. The reader may not use it often but it is a life-saver when you need it.



The materials include a piece of $\frac{1}{4}$ " clock spring to form the loop, a bicycle spoke for the connecting rod, a bicycle nut soldered into a larger hex nut to form the tightener and finally a piece of $\frac{1}{4}$ " copper tube slightly flattened to form the handle.—Submitted by George R. Tryner, Sebastopol, Calif.

★ ★ ★

How Much Is Your Muscular Energy Worth

MUSCULAR exercise is a good thing for maintaining bodily health and vigor. But regardless of how strong you are you will no doubt be amazed to find that the money value of your strength is practically zero.

For instance, this writer once boasted about his feat of unloading 40 tons of coal from a railroad car in one day. He shoveled the coal to a height of 8 feet. He, therefore, did $40 \times 2000 \times 8$ or 640,000 foot-pounds of work during that 10-hour day. He got less than \$5.00 per day, but at that rate he would have done 1280 foot pounds of work for one cent.

Now compare that with the cost of power as produced by fuel. The author has before him a statement by a prominent manufacturer of hoists who claims that his hoists will lift 100 pounds to a

height of 1000 feet for one cent. In other words, that is 100 x 1000 or 100,000 foot-pounds for one cent, as compared with the writer's mere 1280 foot-pounds for one cent.

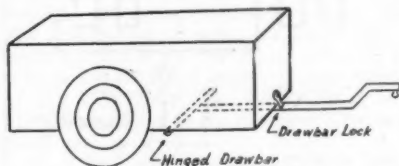
Divide 100,000 by 1280 and it will be found that the cost of human energy is 78 times that of energy produced by fuel. All of which means that, in terms of mechanical power, the true worth of unloading the above car of coal would be 6.4 cents and not \$5.00.

What is your best feat of strength? And how much would it be worth in terms of mechanical energy? 640,000 foot-pounds in 10 hours, by the way, amounts to a little less than 1/30th of one horse power. And that, mind you, was perhaps the best day's work this writer ever turned in.

This would seem to be one of the best sales arguments for modern power tools in your work.—Submitted by W. F. Schaphorst, Newark, N. J. L

★ ★ ★ SERVICE TRAILER

HERE is an idea which has saved me some mighty hard work and backaches. Half-ton trucks cost a lot of money these days and if you are not in need of one all the time you hesitate to make the investment. A two wheel



trailer, however, is quite inexpensive if you build it yourself. I built one, designed to fit my need.

First, by using a drop axle I built it just 10" from the ground. Next, I fitted it with a draw bar which would permit me to tilt the trailer like a dump truck but without disconnecting it from the car. When tilted I have about a 15 degree incline which is not too great to push a refrigerator up when mounted on a dolly. I completed the trailer in a week at a cost of \$100.00 and now I can handle any domestic refrigerator alone.—Submitted by R. T. Chambers. Bellflower, Calif.

SERVICE ENGINEER

FORCED CONVECTION UNITS

BECAUSE of the wide difference in constructional features, cubic feet of air per minute passing over the coil, and the wide field of applications on which it may be used, it is impossible to outline any general method of calculating the Btu. capacity of forced convection units. Therefore, the manufacturer's specifications must be used as the only means of determining capacity.

The selection of a new unit should be governed by (1) The load to be handled, (2) The refrigerant used, (3) The temperature difference between the refrigerated space and the refrigerant, (4) The refrigerator temperature.

The temperature difference will be governed by the relative humidity required, on those applications operating on a refrigerator temperature above freezing. The relationship between the two may be roughly determined by the following:

Humidity	T.D.
Up to 75%	18-20 degrees
75 to 85%	13-17 degrees
85% or over	10-12 degrees

On systems operating at temperatures below freezing the temperature difference is governed by the temperature of the refrigerated space. For refrigerator temperatures between 14 and 32 degrees the operating temperature difference of the coil should be 14 to 17 degrees. For refrigerator temperatures below 14 degrees the T.D. should be 10 to 12 degrees.



"I never could remember the difference between oxygen and air for leak testing."

QUESTIONS



ANSWERS

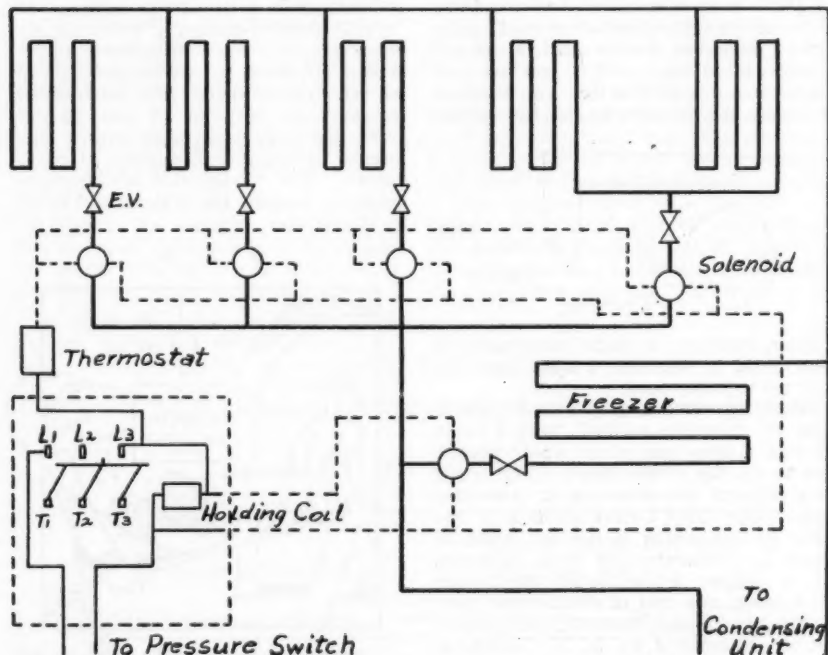
Comments on Questions

REFERENCE TO QUESTION 823: Reading Questions and Answers in the March issue, I find that question 823 is a twin brother to a problem I had to solve some six months ago. The sketch shows what mine looked like after revamping. Here's what proved to be the cure:

Put a solenoid in the liquid line ahead of each expansion valve, as close to the expansion valve as possible. On the deep freeze coil, hook solenoid in parallel with holding coil on motor starting switch. This assures liquid line shut-off on the "off" cycle. Hook all other solenoids same way with cold con-

trol in series on one side of circuit. This gives dual control—first one satisfied, shuts off liquid. This arrangement leaves a starved or dry coil for the start, no liquid to be pulled over to suction line.

The two coils fed from same valve only tend to create headaches and a lot of fruitless overtime for the serviceman. I'd change to two valves at once. However, he might improve the present situation by inserting a C.P. valve in suction line from coil getting most of refrigerant. DEFINITELY get those solenoids out of suction line.—R. Thomas Brett, Akron, Ohio.



Coil and control arrangement of cold storage system.

Building a Freezer

QUESTION 827: An institution wishes to build a walk-in cabinet with a temperature of zero F. and inside of this holding cabinet to have a smaller compartment for deep freeze with assembled quick freeze plates with a capacity of 600 lbs. The overall dimensions of the above cabinet to be 15'x12'x7'. It will be placed in a cement basement with a year round temperature of 70-80 degrees F.

What should be the wall thickness and of what material should the above cabinet be built? Do you not think it would work well to have two high sides, one large for the holding cabinet and a smaller one for the deep freeze? Kindly give me sizes including horsepower for each. F-12 for refrigerant. Water cooled, water temperature 50-60. They do not want a fan driven unit in the holding cabinet, just natural circulation of air. Kindly give me plate capacity in Btu. to do this.

ANSWER: Assuming the dimensions as given to be outside, that is 12' wide by 15' long x 7' high, we would recommend 6" insulation for sidewalls and ceiling, and 8" for the floor. For a quick freeze load of 600 pounds daily to be processed within a ten to twelve hour period, our recommendation would be the installation of two bank assemblies, each consisting of six plates 12"x144", and one shelf stand assembly consisting of six 22"x72" plates, which could be spaced according to the customer's specifications.

The shelf stand would serve as the sharp freeze section. It could be separately enclosed or not, as preferred. It would not be necessary to insulate this unit separately. The plate operating temperature should be 15 degrees lower than the room temperature desired; therefore, to hold zero degrees, the sharp freeze would be operating at minus 15 degrees. This type of installation has been used for many similar applications and should work out nicely in this case.

Refrigerating a Truck

QUESTION 828: Kindly let me know the size of compressor and motor needed for a truck body refrigerated with hold

over plates. Following is the necessary data.

The capacity is 220 cu. ft. The sides, front and back are insulated with 6" glass fibre, the bottom 6" cork slabs, and the top 8" glass fibre. Seams and frame asphaltum. There are 3 doors 30"x34". Type D.804 plates (4 plates). Size of plates 30 $\frac{1}{2}$ "x66". Btu. capacity 17,450. K factor 64. Internal tubing $\frac{7}{8}$ O.D. x 55.3 ft. F-12 refrigerant will be used.

The temperature desired is minus 10 F. (low temperature heavy duty hold over plates). Peak of summer outside temperature will be about 90 degrees. The truck will be on the road 10 hours doing heavy service. (12 hours for charging—2 hours for loading). Ice cream will be loaded at minus 15 F. Specific gravity is 9.0 at 60 F. The suction lines are $\frac{5}{8}$ " and the liquid lines $\frac{3}{8}$ ". A Frigidaire pump will be used.

ANSWER: In reviewing the specifications you have given, we have also refigured the plate requirements, based on outside truck dimensions which we have assumed to be close to the following: 6' wide x 4' high x 9' long; other specifications as given. The "K" requirements come out at 255. Four D-804 plates are rated at 256, so this would seem to be approximately right.

However, we do wish to call attention to the fact that these specifications are based on maintaining an inside truck temperature of zero to minus 5 degrees F. We notice your specifications call for a desired temperature of minus 10 degrees. The freezing point of the eutectic in these low temperature plates is minus 8 F., and allowing for approximately 10 degree temperature differential between the plate temperature and inside air temperature, it is impossible to maintain for any length of time a temperature of less than zero after a few door openings.

A compressor should be used capable of handling a total of 75,000 Btu. at a suction temperature of minus 18 degrees F. within whatever period is available for recharging.

★ ★ ★

Caution: Do not fill motor bearing reservoirs while motor is running and never use animal or vegetable oils.

Shipments of Air Conditioning and Refrigeration Equipment

SHIPMENTS of complete air conditioning equipment and components and accessories for air conditioning and commercial refrigeration equipment during 1947 were valued at \$200 million, according to the Bureau of the Census, Department of Commerce. Of this total, ship-

ments of components and accessories for air conditioning and commercial refrigeration equipment represented \$162 million, or 81 per cent; complete air conditioning equipment represented \$35 million, or 18 per cent, and ice-making machines the remaining \$3 million.

Of the total value of shipments of components and accessories, condensing units accounted for \$79 million, compressors and compressor units \$25 million, centrifugal refrigeration machines \$8 million, and heat exchanger equipment \$50 million.

The 1947 shipments of \$162 million are almost four times the value of the 1940 shipments (\$45 million), the earliest period for which comparable statistics are available. The 1947 shipments also represented an increase of 37 per cent over the 1946 shipments of \$118 million. Quarterly shipments rose steadily during 1946 and the first part of 1947, to reach a postwar peak of \$44 million during the second quarter of 1947. This represented almost double the \$23 million of shipments during the first quarter of 1946, and an increase of 7 per cent over the \$41 million of shipments during the first quarter of 1947. Shipments during the third and fourth quarters of 1947 decreased about 13 per cent from the second quarter, amounting to \$39 million and \$38 million, respectively.

Quarterly shipments of room-type air conditioners increased steadily during 1946, to reach a maximum of over 4 million during the second quarter of 1947. Shipments during the third and fourth quarters of 1947 dropped sharply, to below the level of the third quarter of 1946. The fourth quarter shipments of \$1.3 million represented a decrease of 68 per cent from second quarter 1947 shipments.

Quarterly shipments of air conditioners, other than room type, also increased during 1946 and the early part of 1947. The postwar peak in quarterly value of shipments was reached during the third quarter of 1947 when shipments amounted to over \$7 million. The fourth quarter shipments decreased 34 per cent amounting to less than \$5 million, the lowest quarterly shipments for 1947.

Factory shipments for export of components and accessories amounted to \$16 million, or 10 per cent of the total shipments of these products; exports of complete air conditioning units amounted to

TOTAL SHIPMENTS - AIR CONDITIONING AND COMMERCIAL REFRIGERATION EQUIPMENT: 1940-1947

Product	1947		1946		1945		1944		1940		
	Number	Value (dollars)	Number	Value (dollars)	Number	Value (dollars)	Number	Value (dollars)	Number	Value (dollars)	
SECTION I—COMPONENTS AND ACCESSORIES											
TOTAL	833,416	161,945,509	753,338	117,800,184	354,401	71,805,707	189,278	47,846,569	211,021	45,405,209	
Condensing units	833,416	72,106,835	753,338	53,379,927	354,401	30,901,920	189,278	21,871,954	211,021	18,806,224	
Refrigerants except ammonia	828,770	72,106,835	753,338	53,379,927	354,401	30,901,920	189,278	21,871,954	211,021	18,806,224	
Air cooled	784,669	61,274,474	712,781	46,340,454	327,031	23,378,295	177,717	15,281,908	187,468	12,313,004	
Water cooled	202,001	10,832,361	61,348	13,574,931	27,368	7,526,605	10,430	4,109,522	22,558	5,531,241	
Compressors and compressor units	202,001	29,822,061	61,348	13,574,931	27,368	7,526,605	10,430	4,109,522	22,558	5,531,241	
Ammonia refrigerants	4,231	9,150,663	3,170	5,862,102	3,211	5,058,997	3,259	3,322,762	84,229	7,953,762	
Refrigerants except ammonia	197,749	15,473,006	188,394	9,314,939	104,129	4,319,362	70,666	3,310,402	83,155	4,849,500	
Heat exchanger refrigeration machines	7,692,388	312	6,929,747	183	2,993,492	70	1,735,712	112	2,403,536	112	2,403,536
Evaporative condensers	5,997	7,106,416	4,659	4,937,446	2,885	2,823,277	1,606	1,700,151	2,413	1,709,687	
Unit coolers	141,163	19,611,093	190,552	18,202,691	91,003	10,484,577	58,921	6,630,647	63,417	7,076,213	
Refrigeration	16,025	5,829,173	9,531	3,880,182	2,840	1,484,971	1,323	642,538	5,055	2,269,210	
Other heat exchanger equipment ¹	125,136	13,781,920	181,021	8,317,508	88,153	8,988,100	57,398	5,988,100	57,462	4,807,003	
		23,658,475		17,290,632		9,460,702		9,284,271		6,264,798	
SECTION II—SELF-CONTAINED AIR CONDITIONING UNITS AND ICE-MAKING MACHINES											
Self-contained air conditioning units	69,734	34,994,660	47,664	19,499,737	14,973	11,229,868	n. a.	n. a.	n. a.	Not available	
Room type	42,606	9,863,178	29,835	5,869,462	1,126	326,393	n. a.	n. a.	n. a.	n. a.	
Other than room type	27,128	25,131,482	17,829	13,630,245	13,847	10,903,473	4,408	3,614,646	5,880	4,466,926	
Ice-making machines	7,462	3,014,460	n. a.	n. a.	2,803	4,044,695	3,665	3,351,368	1,945	628,328	

AIR CONDITIONING EQUIPMENT AND COMPONENTS AND ACCESSORIES FOR AIR CONDITIONING AND COMMERCIAL REFRIGERATION EQUIPMENT* SUMMARY OF SHIPMENTS BY MAJOR CLASS OF PRODUCT, FIRST QUARTER 1948 AND FOURTH QUARTER 1947

Product	First Quarter 1948 Shipments of Complete Units					Fourth Quarter 1947* Shipments of Complete Units					
	Total		Domestic ¹		Export ²	Total		Domestic ¹		Export ²	
	Value (dollars)	Number	Value (dollars)	Number		Value (dollars)	Number	Value (dollars)	Number		
	Number	Value (dollars)	Number	Value (dollars)		Number	Value (dollars)	Number	Value (dollars)		
SECTION I—COMPONENTS AND ACCESSORIES											
TOTAL.....	39,051,071	34,857,474	16,652	4,193,597	186,425	37,907,568	33,197,674	17,643	4,709,804		
Condensing units.....	173,812	17,656,993	157,160	15,284,472	16,652	2,372,521	18,529,884	168,782	15,961,245	17,043	
Ammonia refrigerants.....	425	631,664	352	546,597	73	85,067	624,011	363	512,233	94	
Refrigerants except ammonia.....	173,387	17,025,329	156,808	14,737,875	16,579	2,287,454	17,905,373	168,419	15,449,012	17,549	
Air cooled.....	163,883	13,040,170	148,498	11,821,743	15,395	1,818,427	17,049,154	158,614	13,453,142	16,435	
Open type.....	97,812	6,534,804	90,939	5,365,790	13,235	1,718,947	6,400,340	92,833	5,016,947	16,230	
Water cooled.....	9,494	3,385,159	8,310	2,916,132	1,184	469,027	3,583,749	9,805	3,913,870	1,114	
Compressors and compressor units.....	44,481	6,885,917	37,581	6,113,181	6,900	772,736	6,198,651	37,516	5,044,068	13,248	
Ammonia refrigerants.....	1,592	2,962,306	1,389	2,603,379	203	358,927	1,377	2,734,402	1,082	2,062,310	295
Refrigerants except ammonia.....	42,889	3,923,611	36,192	3,509,802	6,697	413,809	3,464,249	36,434	2,981,778	12,953	
Centrifugal refrigeration machines.....	83	2,421,621	74	2,145,659	9	275,962	2,210,011	81	2,089,177	8	
Heat exchanger.....	12,086,540	11,314,162	155	772,378	89	10,909,322	10,103,164	10,103,164	860,358		
Evaporative condensers.....	1,489	1,914,007	1,334	2,232,766	1,267	3,466,826	1,131	1,392,108	1,325		
Unit coolers.....	22,479	4,061,842	20,295	3,727,821	26,588	4,080,237	24,033	3,660,289	2,825		
Air conditioning.....	3,649	1,581,937	3,245	1,451,570	2,977	1,124,767	2,853	1,024,750	124		
Refrigeration.....	18,830	2,479,905	17,050	2,276,251	23,881	2,904,470	21,180	2,635,530	2,701		
Other heat exchanger equipment ¹	6,110,691	5,890,100		214,591		5,333,459		5,050,677			
SECTION II—SELF-CONTAINED AIR CONDITIONING UNITS AND ICE MAKING MACHINES											
Self-contained air conditioning units.....	22,146	12,331,237	20,635	11,466,602	1,511	864,635	9,801	6,105,502	4,998,150	1,107,352	
Room type.....	11,420	2,750,804	10,265	2,204,632	1,155	546,172	4,020	1,297,043	3,456	1,869	
Other than room type.....	10,726	9,580,433	10,370	9,261,970	356	318,463	4,781	4,808,459	4,566	475,909	
Ice making machines.....	2,213	759,505	2,064	678,095	149	81,410	2,504	504,466	2,274	428,873	

* Revised.
¹ Continental United States.
² Includes Canada, Mexico, and United States territories.
³ Includes condensers and liquid coolers, shell and tube and shell and coil types, as well as fin coils (heating and cooling) and plate type evaporators.

\$3 million or 9 per cent; and exports of ice-making machines amounted to \$0.8 million or 26 per cent. The export statistics included in this release represent data reported at the manufacturers' level, based on their knowledge of the ultimate destination of the product, and may therefore differ from actual exports.

The shipment statistics included in the report apply to equipment actually billed and shipped. These figures are equivalent to completed sales. Complete units delivered on consignment or shipped to a branch warehouse for stock are not included until such time as they are actually sold. The dollar values shown are the manufacturers' net billing prices, f.o.b. factory. The data for some types of air conditioning and refrigeration equipment have been combined in the tables of this report in order to avoid disclosing the operations of individual companies.

This annual release, containing revised data for the four quarters of 1947, incorporates all of the statistics published in this series for 1947 in order to provide a single reference copy to replace the quarterly releases. Two major revisions have been made in the statistics. The first revision is in the data for compressors manufactured by reporting plants and incorporated into their own products. These data have been revised on the basis of additional information received from compressor manufacturers. The other major revision is in the small size compressor and condenser units. For the past few years some household units were reported to this Bureau as commercial refrigeration units. However, revised data were obtained for 1947, and these units have been eliminated from the statistics for this year. Data for previous years are not so revised and are, therefore, not strictly comparable.

The statistics for 1947, based on reports submitted to the Bureau of the Census on quarterly report Form M52A, Part II, are preliminary, and include estimated figures for a few companies which did not submit reports. Final figures will be published as a part of the Census of Manufacturers for 1947, which is now being taken. Sixty-nine plants were active in this industry as of the fourth quarter of 1947.

Shipments of complete air conditioning equipment and components and accessories for air conditioning and com-

mercial refrigeration equipment were valued at \$52.1 million during the first quarter of 1948. This figure showed an increase of 17 per cent over the \$44.6 million shipped during the fourth quarter of 1947.

First Quarter 1948

With the exception of condensing units, shipments of the major classes of equipment increased during this quarter. Shipments of self-contained air conditioning units more than doubled, increasing from \$6.1 million during the fourth quarter 1947 to \$12.3 million during the first quarter 1948, and shipments of ice-making machines increased 35 per cent during this period, from \$564 thousand to \$760 thousand. Shipments of compressors and compressor units, centrifugal refrigeration machines, and heat exchanger equipment increased about 10 per cent, while shipments of condensing units decreased 5 per cent.

This release is based on the activity of 68 manufacturers of components and accessories and complete air conditioning equipment. Estimates were made for a few companies (representing only a small portion of the total industry) who did not submit their reports in time to be tabulated. The data included in the release are believed to represent substantially all component manufacturers and air conditioning equipment producers.

The shipment statistics included in the report apply to equipment actually billed and shipped. These figures are equivalent to completed sales. Complete units delivered on consignment or shipped to a branch warehouse for stocks are not included until such time as they are actually sold. The dollar values shown are the manufacturers' net billing prices, f.o.b. factory. The data for some types of air conditioning and refrigeration equipment have been combined in the tables of this report in order to avoid disclosing the operations of individual companies.

The table in this report presents information on manufacturers' shipments of air conditioning equipment, and components and accessories for air conditioning and commercial refrigeration equipment. As indicated in the annual summary for 1947, some of the figures for the fourth quarter 1947 have been revised.

Contractors First Annual Golf Tournament

THE Midlothian Country Club south of Chicago was the scene of the First Annual Golf Tournament sponsored by the Refrigeration Contractors Association of Chicago for its members and their guests on Tuesday, July 13.

The golf tournament was preceded by luncheon served on the veranda of the rambling colonial clubhouse overlooking the golf course.

A surprising number of Chicago's leading refrigeration wholesalers attended, and they were in no small measure responsible for a great portion of the success of the event. These same Chicago refrigeration wholesalers were the donors of a magnificent trophy awarded to the member of the RCAC having the highest score, to be retained by such member for a period of one year or until the next annual golf tournament, at which time it is to be passed on to the winner of that event.

The dinner party following the afternoon of golf will not soon be forgotten by the more than 70 members and guests who attended, for it was undoubtedly the highlight of the day. Extremely brief welcome addresses were given by President Wheeler and Secretary Howe, who, as Golf Chairman, was highly commended for his untiring efforts and the success of the meet.

Jack Glass, president of the Refrigeration Equipment Wholesalers Association, was thanked for the efforts he had put forth in making the day so successful and was asked to make the presenta-

tion of the trophy from his association to the winner—L. C. (Andy) Anderson of the City and Suburban Refrigeration Company.

Twenty-four prizes were awarded. Leo Keely, champion of the day, was awarded a swell traveling bag, and second and third prizes went to I. J. Kristufek and Carl Bergquist.

The evening was concluded with an informal party and, all in all, it was a great day. Members are looking forward with eager anticipation to a repeat performance in 1949.

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Supersonic Refrigeration?

WHAT else shall we call it? It is needed in jet planes to crack the sonic wall of resistance to greater speeds.

Aviation experts have reached the wall and are on the verge of cracking it but one of the myriad of problems facing designers is "cockpit heating." That is the rapid rise in temperature in the plane due to the tremendous friction of outside air at high speeds. The faster the plane travels the greater the temperature rise. For example: A 600 mile an hour jet plane will experience cockpit heating of 54 F. above the outside air. At 760 mph. the temperature goes up to 85 F. above the outside air, and at 800 mph. the temperature soars to nearly 100 F.

Refrigeration, of course, is the answer in these pressurized cockpits and some new designing for extra light weight will be needed. Shall we call this new application Supersonic Refrigeration?



Members and guests of the Chicago Refrigeration Contractors Assn. gathered for dinner after a day of golf recently at the Midlothian Country Club near Chicago when this photo was taken. The day was a complete success.



Your service work is easier...

... because



refrigeration valves

are dependable

Refrigeration Valves

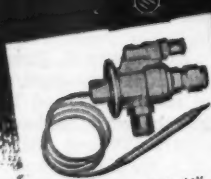
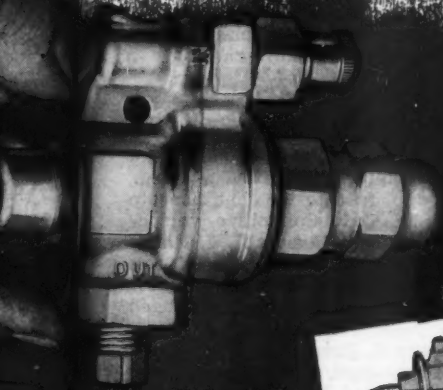
are dependable

The long-life trouble-free service of any A-P Refrigeration Valve is your first proof of A-P DEPENDABILITY. The result . . . whether on original equipment or as a replacement is thoroughly satisfied customers for you, and a boost to your reputation as a refrigeration service engineer. A-P DEPENDABILITY is no accident. A-P engineers *know*, before you get it, just what any one A-P valve will do and take extraordinary precautions to guarantee its dependable performance.

For instance, before A-P Expansion Valve diaphragms are made, a sample of the metal is tested the equivalent of 15 years' valve service. And that is *only one* of our many unusual "shop-proofs" of A-P DEPENDABILITY, done only to help you make more money with A-P DEPENDABLE Valves.

AUTOMATIC PRODUCTS COMPANY

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MODEL 207 THERMOSTATIC EXPANSION VALVE

Dependable



REFRIGERANT VALVES

REFRIGERATION SERVICE ENGINEERS



COMING CONVENTIONS

New England States Association Conference and Exhibits

Place: Hotel Bradford
City: Boston, Mass.
Date: October 8, 9 and 10, 1948
General Chairman: John J. Madden, 212 Madison Street, Dedham, Mass.

11th Annual RSES Convention and R.E.M.A. Exhibition

Place: Sherman Hotel
City: Chicago, Illinois
Date: November 19-22, 1948
Secretary: H. T. McDermott, 433 North Waller Ave., Chicago, Ill.

Illinois State Association

Place: St. Nicholas Hotel
City: Springfield, Illinois
Date: September 25 and 26
Secretary: B. V. Clark, 612 N. May Street, Aurora, Illinois.

New York Chapter Continues Newsy Bulletin

FOR several years, Metropolitan New York Chapter has issued a monthly bulletin to its members. It contains newsy items on the activities of its members; reports of meetings held and planned for the future; applications received; new members admitted; and some service suggestions.

The bulletin is well planned; reproduced in Mimeograph, 5½x8½ inches in size. It is edited by President Fred Asselmeyer with Daniel Salin as star reporter and the composition is under the direction of Fred Worthington.

The staff and officers of Metropolitan New York Chapter are to be congratulated on the result of their work. Chapters considering the issuance of a chapter bulletin would do well to request a

sample copy from Fred Asselmeyer, president Metropolitan New York Chapter, 435 66th Street, West New York, New Jersey.

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San Antonio Association Becomes RSES Chapter

FOLLOWING many months of consideration, the Refrigeration Association of San Antonio which has been functioning as a local organization for several years, affiliated with the Refrigeration Service Engineers Society. This action was taken at a meeting of the Association on June 11th. Carl W. Neisel, International RSES Director, conferred on several occasions with the San Antonio group and the action adopted was the result of these various meetings.

Officers of the local association are: W. A. Moore, *President*; L. J. Jenschke, *1st Vice-President*; A. J. Arnold, *2nd Vice-President*; W. S. Anderson, *Secretary-Treasurer*; and E. B. Parsons, *Educational Committee Chairman*.

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Wallace Named to Code Committee

LEE WALLACE, past president of Elm City Chapter, New Haven, Conn., has been appointed to the chairmanship of the RSES Code Committee, replacing Vice-President Charles C. E. Harris who requested to be relieved of this duty in order to provide more time for the other RSES activities he is engaged in.

International President Wm. J. A. Marshall expressed regret that the lack of time prevented Mr. Harris completing the work he has so ably carried on.

Mr. Wallace will represent the Society on a sub-committee of the American Society of Refrigerating Engineers sponsoring the revision of the B-9 Safety Code under the direction of the American Standards Association.

BACK AGAIN



HEAVY DUTY BEER COOLERS

by Temprite

Out of production since before the war, Temprite heavy duty beer coolers are back again to help you make more money. Now is the time! This is the season! Tell your customers

about Temprite. You can now offer 7 new improved models for every type of beer cooling application. Outstanding features include specially shaped stainless steel coils, compact size and patented temperature control.

Write or wire now for details.

TEMPRITE PRODUCTS CORP.

Originators of Instantaneous



Liquid Cooling Devices

45 PIQUETTE AVENUE

DETROIT 2, MICHIGAN

SERVICE ENGINEER

67

August, 1948



Boston Prepares for Eastern RSES-REMA Educational Meeting

**Record Attendance Expected
at Hotel Bradford, October
8th, 9th and 10th**

how they can be best serviced. You owe it to yourself to take in this conference.

Time schedule for exhibits is as follows:

Saturday, October 8—2 p.m. to 10 p.m.

Saturday, October 9—Noon to 10 p.m.

Sunday, October 10—10 a.m. to 3 p.m.

Friday and Saturday mornings are set aside for educational talks by top leaders in their respective fields. The educational program is being arranged by the International Society. The popular Question and Answer forum will be an important part of the educational program.

Entertainment

Sunday afternoon from 3 to 6 p.m. is set aside for the N.E.S.A. annual banquet and entertainment. Many side trips and interesting tours are planned for the visiting ladies. There is much of the picturesque and historical in Boston.

Hotel Reservations

It is important that hotel reservations be made promptly. All room reservations are being cleared through the Housing Chairmen. Confirmations of reservations will be confirmed directly by the hotel. The deadline for hotel reservations is September 20th. All communications for reservations are to be addressed to: James A. McCue, Chairman R.S.E.S. Housing Committee, 801 Beacon Street, Boston 15, Mass.

While the conference is designated as the First Eastern RSES-REMA Refrig-

THE second regional educational conference and exhibit, jointly sponsored by the Refrigeration Service Engineers Society and the Refrigeration Equipment Manufacturers Assn., with the New England States Assn. of the RSES acting as hosts, will be held in New England's largest ballroom in the Bradford Hotel, Boston, Mass., Friday, Saturday and Sunday, October 8, 9 and 10.

The conference is arranged to bring to refrigeration men on the Eastern seaboard an unparalleled opportunity to learn at first hand just what the manufacturer has designed his equipment to do, and to discuss with manufacturers' engineering and service personnel your own individual problems.

The conference, the second in a series of four being conducted during 1948 and early 1949, brings to regional groups the type of educational program and exhibit especially designed to provide factual information on the products service engineers are using and servicing in their every day activities.

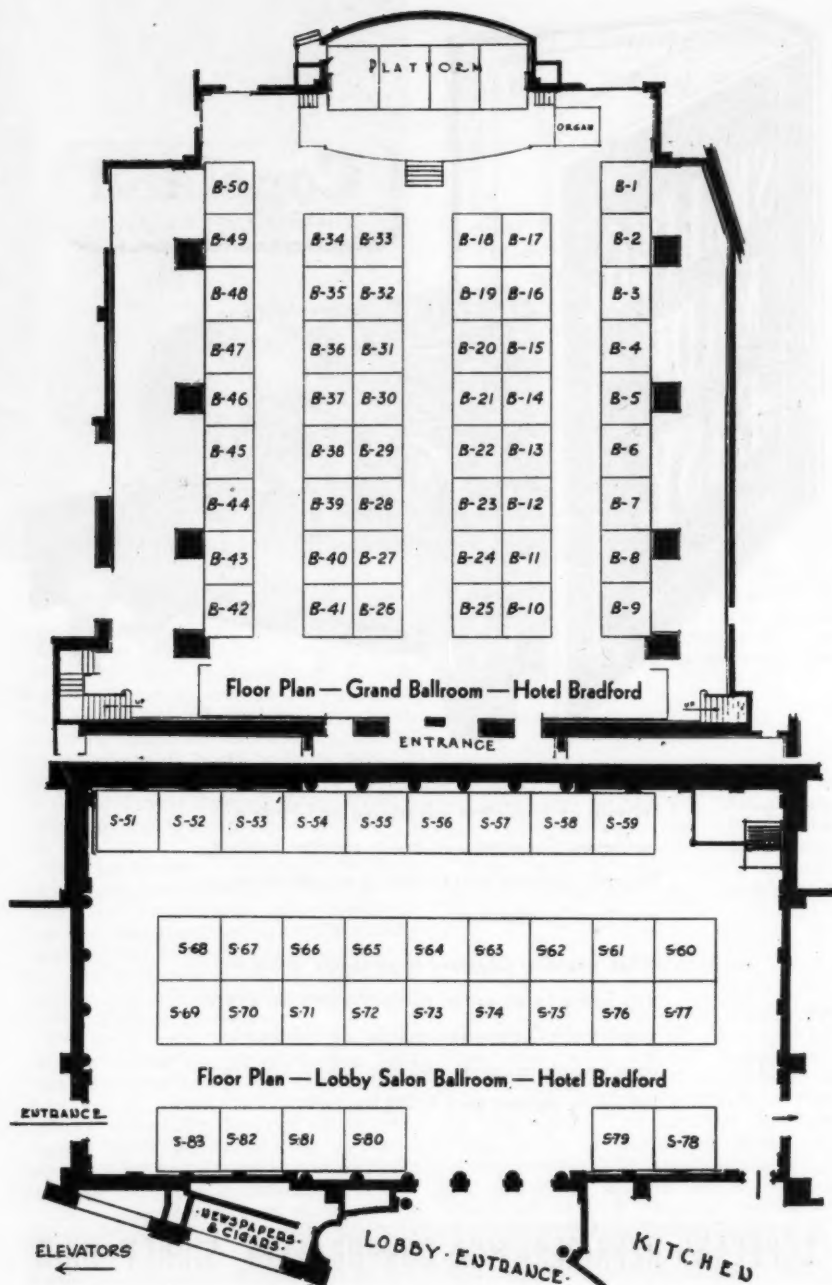
Every one of the 83 exhibits provide an unexcelled opportunity to see how the various manufacturers' products work, what they are intended to do and



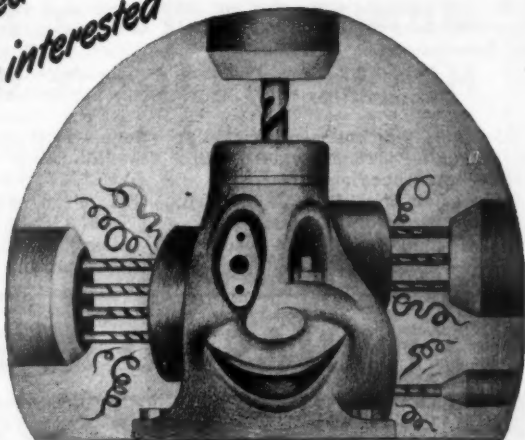
Pre-sold by consistent advertising and trade-wise reputation, Copeland units are in constant demand. They also open the door to sales of associated equipment and installations.

When you offer Copeland to prospects, you're half-way home to an order. Have the unit for every purpose with Copeland's complete line. Sell the economy, smooth operation and long life of Copeland. Immediate delivery on 1 to 7½ h.p. units.

COPELAND REFRIGERATION CORPORATION, SIDNEY, OHIO



*"I'm being bored
but you'll be interested"*



... in these NEW

General Electric Condensing Units

MASS PRODUCED by modern precision methods, the new General Electric Type CW condensing units have the built-in quality to carry on the General Electric tradition for dependability and economy in operation. The new design and new production methods make it possible for General Electric to offer a host of quality features—many of them never before found in small fractional horsepower units.

This line sounds a new note in the commercial refrigeration field. Smartly coordinated in design, it covers the range of from 1/6 hp to 2 hp with 8 air cooled models and includes 4 water cooled units—using only three basic compressors. *General Electric Company, Air Conditioning Department, Section 8128 Bloomfield, New Jersey.*

GENERAL  ELECTRIC
Refrigeration Equipment

eration and Air Conditioning Educational Exhibit and Conference, it is being held in conjunction with the annual RSES convention of the New England States Association.

Committees

RSES committee chairmen actively at work in making arrangements for this important conference are:

General Chairman—John J. Madden, 212 Madison St., Dedham, Mass.

Assistant Chairman—Lee Wallace, 29 Cave St., New Haven, Conn.

Coordinator and Publicity—Chas. C. E. Harris, 2044 Massachusetts Ave., Cambridge 40, Mass.

Arrangements—Arthur Andreen, 79 Bissell St., E. Hartford 8, Conn.

Housing—James A. McCue, 801 Beacon St., Boston 15, Mass.

REWA committees include: Educational—H. F. Spoehrer, Chairman, and the following members: K. B. Thorn-dike, J. M. Schlemmer, E. M. Flannery, G. E. Graff and H. F. Hildreth.

REWA Publicity and Public Relations—George E. Mills and Exhibit Manager, R. K. Hanson.

SAFETY HAS NO SUBSTITUTE



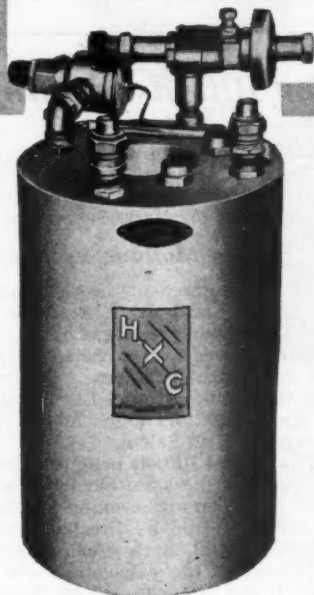
GEORGE J. SCHULD, SR., International Safety Director, has launched a campaign to make every RSES member "safety conscious." The above cartoons are the first in a series to illustrate that a little attention to small details will avert a crippling accident or perhaps a fatality.

While these cartoons are humorous, they are based on recent accidents that have been reported. Two metropolitan dailies have carried stories of children

near suffocation while playing in discarded domestic or walk-in refrigerators, and were fortunately released "just in time." **Play safe—remove or break all latches on discarded boxes where children may be playing.**

Ask yourself the question of "how often you have worked in a walk-in before taking the simple precaution of removing the meat hooks?" Recently a serviceman was impaled on one of these hooks. Result—hospitalization

HEAT-X CAST ALUMINUM LIQUID COOLERS WITH TWO BEVERAGE COILS



For SODA FOUNTAINS

- The Heat-X-Changer liquid cooler now makes possible a dry soda fountain at an economical cost. The result is more space and less maintenance.

The copper coils for fresh water, stainless steel coils for soda water, and copper coils for refrigerant are all in the HEAT-X Aluminum block. Hence, fast cooling and complete protection against all possible freeze-up damage . . . plus maximum sanitation and trouble-free operation.

THE HEAT-X-CHANGER CO., INC.
415 Lexington Avenue, New York 17, N.Y. Brewster, N.Y.

and lost time. **Play safe—remove all meat hooks before starting work.**

As Safety Director Schuld has stated "if we as an association through our safety program are responsible for saving a life or avoiding painful accidents that may result in handicaps for life, then our association membership has more than justified itself."

The International Society has recently

affiliated with the National Safety Council, a world wide organization of companies and associations engaged in encouraging safety in industry, in the home, on the road and at play.

If you have a suggestion for practicing safety, send it to George Schuld, Sr., International RSES Safety Director, 12201 Revere Avenue, Cleveland 5, Ohio. Make safety a part of your daily work.

"On To Springfield" For Illinois Meeting



THE Illinois Association of the Refrigeration Service Engineers Society has the welcome sign out for all refrigeration men in Illinois and surrounding states.

The 11th annual meeting of the state association will be held in Springfield, Ill., on Saturday and Sunday, September 25 and 26. Headquarters will be the St. Nicholas Hotel.

Table displays are being made available to wholesalers, which proved so successful in the tenth state convention.

Early arrivals may register on Friday evening and participate in the educational get-together conducted by Harry Busby, managing editor of The Refrigeration Service Engineer.

Registration will continue Saturday morning and the educational meeting of the convention will start Saturday noon. Frank Frazee, vice-president of the state association and educational director, is completing arrangements for an outstanding program which will continue Sunday morning.

Saturday Afternoon Program

"The Service Engineer and the Five to Fifty Horsepower Market" by T. G. Thomas, Sales Manager, Schnacke, Inc.

"Proper Methods for the Selection of Evaporative Condensers and Cooling Towers" by F. Ed. Ince, Marlo Coil Company.

"Application of Freon-12 Liquid Injectors" by Wm. V. Richards, Sales

Manager, H. A. Phillips & Co.

"New Opportunities and New Problems in Sealed Units" by W. J. Aulsebrook, Sales Manager, Servel, Inc.

Sunday Morning Program

"New Developments in Air Conditioning Equipment" by F. H. Eldredge, General Engineering & Mfg. Co.

Many wives are expected to attend the convention this year. During the day they will visit the Lincoln shrines in Springfield and lunch at the replica village of New Salem.

The annual Illinois banquet, always a highlight of the state meetings, will be held on Saturday evening. Hotel reservations should be directed to the St. Nicholas Hotel, Springfield, Illinois.

Officers of the association are: William J. McCarley, *President*; Francis B. Frazee, *1st Vice-President*; Leslie L. Sturch, *2nd Vice-President*; B. V. Clark, *Secretary*; Ralph Porter, *Treasurer*; and Charles J. Fox, *Sergeant-at-Arms*. Board of Directors—Earl J. Seaton, Edward Riccio, Willis Stafford, H. W. Clark, Gordon Eubanks, Arshall Marcotte, J. K. Farrelly, Louis T. Koehl, Irving B. Anderson, and Richard H. Johnson.

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NESA Bulletin

THE New England States Association is publishing a news bulletin under the name of "RSES Hearsay." It contains items concerning the individual chapters belonging to the association, announcements of events to take place in the future, and helpful reminders to members. The second 1948 edition was just recently released.

save nine drops of every ten with these **MARLO "water-misers"** *

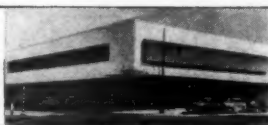


Where water is scarce and expensive — or where sewerage is inadequate — these "twin" Marlo Cooling Towers and Evaporative Condensers solve the problem.

Compact and efficient, they use the same water over and over — save 90% of normal water consumption and water cost—save space! And they're built so sturdy that many in use over 10 years are still giving faithful, economical service.

*MARLO COOLING TOWERS and EVAPORATIVE CONDENSERS

Ultra-modern A. S. Alce building in New Orleans—11,000 sq. ft., completely air conditioned, using a Marlo EC 40 Evaporative Condenser.



MARLO-HEAT TRANSFER
Since 1925

MARLO COIL CO. / ST. LOUIS 10, MO.

Little Egypt Chapter Holds Tube Assembly Contest

FOLLOWING its regular monthly meeting, the Little Egypt Chapter held a tube assembly contest on July 7th at the K & B Appliance Store in West Frankfort, Illinois. The attendance totaled 34 service men, of which 10 participated in the contest.

Judges of the contest were Linden Reese of Salem, Illinois, and Loren Taylor, the Chapter Chairman of Carbondale, Illinois. The official timer was Joe Cavataio of the Illinois Electric Works of East St. Louis, Ill.

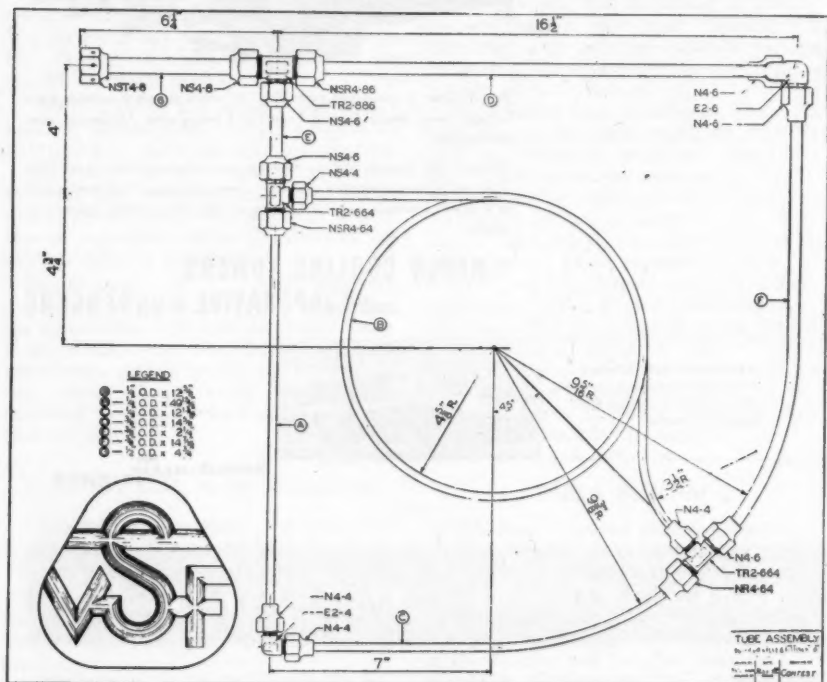
Tubing and fittings were provided by Chase Refrigeration Supply Company of Chicago, Illinois. They also supplied the prizes, which were as follows: First prize—a table radio; second and third prizes each—one set of tube working tools; fourth and fifth prizes each—assemblies consisting of a Superior gauge manifold and two Marsh gauges.

Two door prizes were awarded; a Sporlan expansion valve and a slide caliper.

Jack Glass and Clarence Rogers of Chase Refrigeration Supply Co. awarded the prizes as follows: First prize to H. Poulo of Harrisburg, second prize to Robert McCard of West Frankfort, third prize to Eric McKee, Jr. of West Frankfort, fourth prize to H. F. Diercks of Duquoin, fifth prize to Fred Warmelink of Harrisburg. First door prize went to H. F. Diercks, second door prize to Harry Laughlin of Salem.

The drawings of the assembly were provided by Superior Valve & Fittings Co. Bill Kramer of Superior Conducted the contest. Also present at the meeting were Si Crawford of Budlock Refrigeration Supply Co., Inc., and Rudy Serth of Illinois Electric Works. Refreshments, provided by Chase Refrigeration Supply Co., were served at the conclusion of the meeting.

Contestants are judged on quality of workmanship, proper use of fittings as



Plan of project used in tube assembly contest.

THIS GROOVE IS MACHINED INTO...



IMPERIAL TRIPLE-SEAL FLARE FITTINGS

*To Give You Joints with
Triple-Seal Tightness...*

For extra protection against leakage the Imperial Triple-Seal Fitting has a groove in the seat which brings you triple-seal tightness in every joint.

Here is how it works. When the flare nut is drawn up, the copper tubing is forced into the groove making a tight, self-sealing joint. This joint will remain leakproof even though the face of the seat may be nicked or marred. This Triple-Seal feature is included on all sizes $\frac{3}{8}$ " and larger.

Additional protection against leakage is provided by extra length pipe threads which are longer than formerly on sizes $\frac{1}{4}$ " and over. This extra length is especially valuable where reconnection is necessary.

Specify Imperial Triple-Seal Flare Fittings to get this extra protection against leakage. Remember they cost you no more. All flare ends protected by plastic caps. Ask for Catalog 80 on Imperial Refrigeration and Air Conditioning Products.



Imperial Triple-Seal Flare Fittings have three seals to give you new, extra protection against leakage.

SEE YOUR JOBBER

IMPERIAL

The Imperial Brass Mfg. Co., 534 S. Racine Ave., Chicago 7,

Fittings • Valves • Filters • Driers • Floats • Charging Li
Tools for cutting, flaring, bending, coiling, pinch-off and swedgi

detailed on the blue prints, conformity of tube bending to full scale drawing and on the elapsed time.

A group of three impartial judges render decisions which must be accepted as final. Said judges select and award five prizes to the contestants whose assemblies are completed in the least amount of time and whose workmanship is adjudged to be the best and which most closely conforms to the master drawing. This means that the awards are not necessarily awarded to the contestant that finishes first, however, time consumed is considered an important factor when selecting the winners.

The awards are made by rating the finished jobs on the following point basis. Therefore, the contestant that scores the greatest number of points

is awarded the first prize, the next greatest number of points is awarded the second prize, etc.

Time: Order of finishing

1st—10 points	6th—5 points
2nd— 9 points	7th—4 points
3rd— 8 points	8th—3 points
4th— 7 points	9th—2 points
5th— 6 points	10th—1 point

Proper Use of Fittings:

All Correct—20 points
1 Wrong—18 points
2 Wrong—17 points
3 Wrong—16 points
Etc. Etc.

Quality of Workmanship:

The award of points for workmanship are left to the three judges who award a maximum of 10 points for the best job.

11th Annual RSES Committees at Work

PRELIMINARY plans for the 11th annual RSES Convention to be held in Chicago, November 19-22, at the Sherman Hotel, are under way. Committee chairmen have been planning the activities of their various committees.

tion with the annual convention.

Chairman for other committees include:

Housing: John Heger, President Chicago Chapter.

Entertainment; Dwight Orr, Chicago

Chapter.

Reception; Dan Gott, Chicago Chapter.

Publicity; R. L. Hendrickson, Tri-County Chapter.

Registration; Gordon Eubanks, Corn Belt Chapter.

Secretary of the committee; B. V. Clark, Tri-County Chapter.

Coordinator of Auxiliary Activities;

Wm. J. McCarley, President of the Illinois State Association.

Assistant to International Sergeant-at-Arms; Eugene Monti, Chicago Chapter.

Shortly the housing committee will be mailing forms for hotel reservations. It is urged that members return their reservations promptly upon their receipt in order to insure required accommodations.



FLOYD LILLEY



ED RICCIO



WILLIS STAFFORD

President Wm. J. Marshall of Toronto, has appointed International Director Floyd Lilley as General Conference Chairman. The Illinois State Association and Chicago Chapter will act jointly as hosts to the convention. Co-chairmen of the convention committee will be Edward Riccio, representing Chicago Chapter, and Willis Stafford, acting for the Illinois State Association.

The third regional RSES-REMA educational exhibit will be held in conjunc-

MORE PROFIT—LESS TIME

Analyze Hermetics without Guesswork

Let Annie Do It!

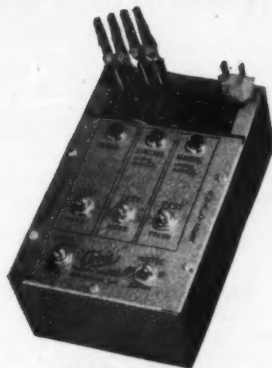
A HERMETIC UNIT ANALYZER which, in a matter of seconds, will positively indicate the nature of any electrical defect.

Annie

REVERSES DIRECTION OF RUN
PROVIDES MANUAL STARTING
INDICATES OPEN OR GROUNDED FIELDS
RELEASES STUCK OR FROZEN UNITS—

stuck units can frequently be freed by reversing the running direction.

ACCURATE—you can estimate closely without fear of having to take a loss. A "must" in any repair kit. Don't be embarrassed by your customer asking: "how do you know?"

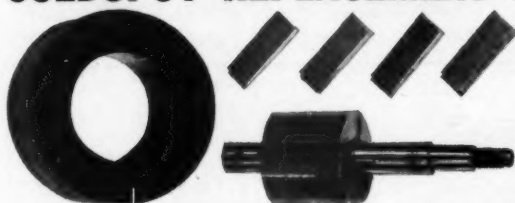


SPECIFICATIONS

Size: 3" x 5" x 8"
Weight: 1 3/4 pounds

Price: **\$16.50**

COLDSPOT REPLACEMENT PARTS



For All Compressors
Having 15/32 Shafts

Matched
Set, Each. **\$14.50**

Lots of 3,
Each..... **\$13.80**

QUIET COLDSPOT CARBON VANES

Available in 3 Sizes—1"-1 1/4"-1 1/2"
Each Set..... **\$1.25**
Lots of 10 Sets..... **\$1.19**
Lots of 25 Sets..... **\$1.13**



Coldspot Check Valve

Stainless Steel Seat; Swedish
Steel Disc; No Tools Necessary
to Install in 5 Minutes

Each **\$2.25**
Lots of 10 **\$2.00**



BELLOWS SEAL

Each **\$3.00**
Lots of 10 **\$2.85**

Coldspot
Drive Couplings
&
Dome Gaskets

MECHANICAL ENTERPRISES DEPARTMENT 36

4856 LANKERSHIM BLVD. NORTH HOLLYWOOD, CALIF.

SERVICE ENGINEER

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August, 1948

Golden Gate Auxiliary In Formation

WHILE the men of the Golden Gate Chapter were engaged in a softball game at their annual picnic held at Searsville Lake on July 11th, the women—under the capable leadership of Mrs. Eugene Larsen—laid the groundwork for the formation of a Ladies Auxiliary.

A meeting has been set forth for the first official gathering for the purpose of nominating and electing officers.

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New Chapters

Edmonton, Alberta, Canada—At a meeting on May 21st a group of eighteen service engineers signed a petition for a charter for a chapter to be known as Edmonton Chapter. Temporary officers are: G. Clarke, *President*; A. Garroway, *1st Vice-President*; E. Bland, *2nd Vice-President*; R. Soper, *Treasurer*; and R. J. Berube, *Secretary*.

Yosemite Chapter, Modesto, Calif.—Twenty-three prospective members residing in Modesto and surrounding territory, have petitioned the International

Society for a charter. The chapter is named Yosemite and was assisted in its formation by the California Association through J. Pat Riley, past president. The officers of the chapter are Dewey Stines, *President*; Othel Robbins, *Vice-President*; Al Luke, *Secretary*; Joe Becker, *Treasurer*; Wm. Imfeld, *Educational Chairman*; and Elmer Hurd, *Sergeant-at-Arms*. The chapter has affiliated with the California Association.

Tacoma Chapter, Tacoma, Wash.—Started in May, Tacoma Chapter recently presented a petition for a charter through International Director O. C. Yates of Seattle, who assisted in forming the association. The new chapter starts with forty members.

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Welcome to the Men from "Down Under"

FURTHERING the truly "International" aspect of the RSES, a charter has been requested for a Sydney, Australia chapter. The request for charter follows after considerable correspondence and a visit to International



Buckeye State Association has inaugurated its Safety Program by issuing an 8 1/2 x 11" illustrated bulletin to its membership. Designated as its "Detect and Correct" program, it is planned to send these safety reminders regularly to the membership of the state association.

PERFORMANCE!

STANDARD

Model JS

EVAPORATORS

**WITH
HORIZONTAL REFRIGERANT
PASSAGES AND UNIVERSAL
MOUNTING BRACKETS IN-
CREASES THEIR**

PERFORMANCE

**TO THOUSANDS OF
INSTALLATIONS**



USE STANDARD
HEAT TRANSFER APPLIANCES



YOUR REFRIGERATION SUPPLY WHOLESALER HAS THEM

STANDARD *Refrigeration Co.*

332 S. HOYNE AVE. CHICAGO 12, ILL.

Headquarters by Eric Ebeling, member-at-large and engineer for F. C. Lovelock, Ltd. of Sydney, who transmitted the necessary information to the group upon his return to Sydney.

Assisting also in the formation of the chapter was Jack E. Crickmore, a for-

mer member of Hub Chapter of Compton, Calif., who recently moved to Sydney.

The petition containing 21 names was forwarded by R. J. Lyon of the Premier Refrigeration Co. Ltd., Sydney, who is acting as temporary secretary.

CHAPTER NOTES

● **ARROWHEAD CHAPTER, Riverside, Calif., July 12**—J. Pat Riley of Long Beach Chapter was on hand to install the new officers, the names of whom were published in the chapter's minutes of June 14. Retiring President Herb Kaeding was presented with an engraved gavel as a token of appreciation for his efforts during the past year. After the installation, Educational Director Frank Frazier introduced Emmet Haynes, Kenny Lloyd and Paul Pleasant from the Frigidaire Division of General Motors Corp. Mr. Haynes conducted an illustrated lecture on Frigidaire commercial sealed units and the proper methods of servicing. The meeting was attended by 34 members and 15 visitors, all of whom enjoyed the program and the refreshments that followed.

● **AZALEA CITY CHAPTER, Mobile, Ala., June 16**—Visitors at this meeting included Milton Gilmore of the Standard Brass Company, New Orleans, La., and Lawrence Geci of the Riviera Utilities Company, Foley, Ala. D. P. Breland, Chairman of the Educational Committee, read a bulletin issued by the International Office concerning recorded lectures available for local chapter's educational programs, and it was unanimously voted to authorize the chairman to make the necessary arrangements to take advantage of this educational program at once. Another guest, Mr. Merrill of the Birmingham Chapter, led a discussion on the State Convention and also explained in detail how to become a certificate member, recommending that all active members consider taking the certificate examination. A final and very interesting discussion on the subject of Soldering Stainless Steel Evaporators followed. The July 21st meeting started with the introduction of the visitors attending. D. P. Breland, Chairman of the Educational Committee, announced that Mr. Sutton of the Murphy Tech Refrigeration School would show a moving picture film on Acetylene Welding.

● **BERKSHIRE COUNTY CHAPTER, Pittsfield, Mass., June 9**—Frank Meyers and Roy Graham were in charge of the educational program, which was a demonstration and lecture on the Kramer Thermobank.

On June 23rd the election of officers took place with the following being elected: Robert Smith, President; Elmer Baldwin, 1st Vice-President; Louis St. Pierre, 2nd Vice-President; Leonard Whitney, Secretary; Albert Garnish, Treasurer; and Arnold Brault, Sergeant-at-Arms. Board of Directors—Messrs.

Hodgkins, Allen and Hamilton. Educational Chairman—Elmer Baldwin.

● **BOSTON CHAPTER, Boston, Mass., June 8**—During the business meeting Wm. B. Festa, Carl H. Landin, Jr., Herman E. Whelpley and John M. Blanchard were accepted as active members. Junior members accepted were John S. Oley, Geo. A. Campbell, Jr., and Alfred L. Peterson. Educational Chairman Ralph Metcalf presented a Stump the Experts Session, the experts being Past Presidents Bradford, Alexander, Pierce, and Chas. Harris, Chas. Galli and Sis Ashe.

● **CHARLESTON, S. C. CHAPTER, Charleston, S. C., July 7**—This meeting was devoted mainly to the election of new officers who are: Marion B. Stroman, President; Robert L. Ebinger, 1st Vice-President; John L. Pardee, 2nd Vice-President; A. L. Burruss, Secretary; James E. Jordan, Treasurer; Robert L. McLean, Sergeant-at-Arms; and George W. Moody, Educational Chairman.

At the July 21st meeting, R. L. Ebinger gave a lecture on the various methods used to figure loads, etc. for commercial refrigeration machines. An open discussion followed. After adjournment, refreshments provided by J. C. Corvette, were enjoyed by all present.

● **CHARLESTON, W. Va. CHAPTER, Charleston, W. Va., July 9**—The following officers were installed at this meeting: L. C. Black, President; R. H. Amick, 1st Vice-President; John Deskins, 2nd Vice-President; Pat Miller, Secretary; Harry G. Frame, Treasurer; and C. A. Wiley, Sergeant-at-Arms. Directors—E. A. Montgomery, Joe W. Price, L. E. Von Woglom and C. A. Griffis. Guest speaker was Paul B. Reed, Chairman of the International Educational and Examining Board. His topic was "Oil and Refrigerant Mixtures."

● **CORPUS CHRISTI CHAPTER, Corpus Christi, Tex., July 13**—The educational program for the evening was furnished by Rem Supply and consisted of a low temperature welding demonstration using eutectic welding rods. The demonstration was conducted by C. B. Robbins and was very interesting. Many different combinations of metals were used. The members were given an opportunity of asking questions which were answered by Mr. Robbins. It was the opinion of the 20 members and 12 visitors present that this was one of the most instructive programs held by the chapter for many months. After the demonstration, all members were invited to the Bay Room of the Breakers Hotel for refreshments furnished by Rem Supply Co.

● **DAYTON CHAPTER, Dayton, Ohio, July 22**—About 30 members met in the showroom

To Help You Sell More

Curtis AIR CONDITIONERS
Are Advertised in the
"SATURDAY EVENING POST"
"TIME"
AND OTHER LEADING MAGAZINES

You have seen Curtis Air Conditioners featured in full pages in color in the Saturday Evening Post and Time presenting the advantages of Curtis "Comfort Zone" Air Conditioning to more than 5,500,000 readers.

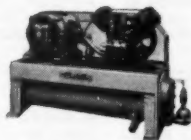
Here's your opportunity to reap the benefit of the great selling and merchandising power of these outstanding publications—reaching your major markets.

Sound design and engineering have proven Curtis units to be ideal for stores, offices, taverns, drug stores, apparel shops, beauty parlors, restaurants and many others.

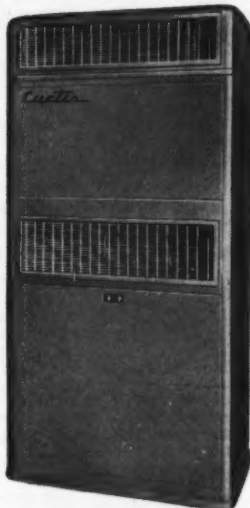
It will pay you to get set to sell this vast and rapidly growing market now.

Write to Curtis for full information on how you can tie in with Curtis' new national advertising plans and assure more air conditioning sales and profits for 1948.

It's big news for dealers—Curtis now advertises in Saturday Evening Post and Time.



Curtis Condensing Units for Commercial Refrigeration— $\frac{1}{4}$ to 30 H.P. air and water cooled.



Curtis Air Conditioning Units 3, 5, 7 $\frac{1}{2}$, 10 and 15 Tons



REFRIGERATING MACHINE DIVISION

of Curtis Manufacturing Co.

1952 Kienlen Ave.

St. Louis 20, Mo.

94 Years of Precision Manufacturing

AB-597A

SERVICE ENGINEER

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August, 1948

of the Miami Valley Distributing Co., and after a short business meeting, John Becker introduced Mr. Wilson of the Imperial Brass Co., who conducted a tube bending contest in which twelve contestants took part. First prize—a very fine tube cutting and flaring kit—was won by Ed Unthank. Tom Callison won another as second prize, and Russell Wagner took the third prize which was donated by Kiefhaber's. Miami Valley Distributing Co. then furnished a nice luncheon which was served by the Ladies Auxiliary.

● **ELM CITY CHAPTER, New Haven, Conn., July 7**—Chapter meeting dates are the first Wednesday of every month at 201 West Hazel Street in New Haven. Officers elected to serve for the 1948-49 term are: Thomas B. Howell, President; Frank J. Moran, 1st Vice-President; Joseph C. Gancarz, 2nd Vice-President; Lee J. Wallace, Secretary; Charles A. Smith, Corresponding Secretary; Adolph G. Blomberg, Treasurer; Rex F. Barnes, Sergeant-at-Arms; and Frank E. Morley, Educational Secy.

In Memoriam

LAWRENCE W. Porter, husband of Dorothy Johnson Porter, passed into rest at the United States Veterans' Hospital at Rocky Hill, Conn., June 22, 1948.

"Larry" was a veteran of World War I and a real friend to all. He bore his constant suffering quietly and always found time for a smile and chat with his many friends.

Though Larry was one of our newer members of Elm City Chapter, his absence will be sorely felt. He is not here but a smile lives forever!—*Lester H. Harris, Secretary, Elm City Chapter.*

● **FAIRFIELD COUNTY CHAPTER, Bridgeport, Conn., July 12**—President Earl Walters reported on the special meeting of the New England States Assn., during which plans were made for the convention to be held in Boston on October 8, 9 and 10. An educational film was shown on the methods used in repairing high side and low side floats. The next meeting will be held the second Monday in September.

● **GOLDEN GATE CHAPTER, San Francisco, Calif., July**—The following members of the chapter were elected to hold office for the coming year: M. B. Willis, President; Frank Atwood, 1st Vice-President; S. E. Grabbill, 2nd Vice-President; Frank Dwyer, Secretary; Eugene Larsen, Asst. Secretary; Arthur W. Frazier, Treasurer; Gus W. Lindell, Sergeant-at-Arms; and Harry Price, Educational Director. Board of Directors—Frank B. McDermott, Frank H. Atwood, G. W. Lindell, Larry J. Fistolera, W. B. McCombs, T. Frank Sullivan, Irving J. Westland, and Leonard O. Gray.

● **GREENVILLE CHAPTER, Greenville, S.C., July 14**—A special report by Dick Ryer on publicity led to a discussion on having customer return cards printed. The card would be given to each customer upon the completion of the job, self-addressed to the chapter, giving the customer a chance to comment on the work of the serviceman. Mr. Phund of Fine Products Co. was a guest at this meeting and spoke to the members in an informal chat after the regular meeting.

● **HOUSTON CHAPTER, Houston, Texas, June 8**—John Hendrick presented a film and narration entitled "Rubber Unlimited" which proved to be very educational and furthered the understanding of what takes place in the belt industry in respect to the part it plays in the air conditioning and refrigeration industries. P. J. McCarty of the Sporlan Valve Company gave a talk accompanied by a series of slides on expansion valves which was interesting and informative to all.

● **LA CROSSE CHAPTER, La Crosse, Wis., June 4**—Officers elected to hold office for the fiscal year of July 1, 1948 to June 30, 1949 are: Alfred W. Roelling, President; W. W. Schomburg, Vice-President; F. A. Reiman, Secretary; Charles W. Erlandson, Treasurer; and Chas. Fiedler, Sergeant-at-Arms.

● **LONG BEACH CHAPTER, Long Beach, Calif., June**—Election of officers was held at this time with the following results: Troy Langwell, President; E. L. Murphy, 1st Vice-President; Leon A. Smith, 2nd Vice-President; L. M. Ostrander, Secretary; Paul Travers, Treasurer; Robert Nichols, Sergeant-at-Arms; and Thomas Renzi, Educational Director. Board of Directors—Lee Bradford, Joe Mura, and J. K. Walker.

Fifty members and fifteen visitors were present at the July 14th meeting. An educational round-table discussion was held from 7 to 8 p.m. with Past President Roy Willis as arbitrator. This was followed by the business meeting which lasted one hour, after which the raffle took place. Prizes were won by Charles Edwards of the Arrowhead Chapter, Lee Bradford, Al Haun, Harold Bontekoe and Lyle Evans, who won the flushing set. Two of the raffle prizes were three-layer, homemade cakes presented to the chapter by the wife of member Ed. Smith. Educational Director Tom Renzi then announced the program for the evening, a low temperature welding demonstration using the latest materials and methods. Mr. Van Ginkle conducted the program. Refreshments were served by officers Langwell, Murphy and Ostrander.

● **MILE HIGH CHAPTER, Denver, Colo., June 16**—Thirteen applications for membership were approved at this meeting. New officers installed by Installation Officer D. D. Walchier were: Charles M. Sisson, President; Lyle L. Smith, Vice-President; H. R. Zeller, Secretary; Leonard Martin, Treasurer; and William Niebrugge, Sergeant-at-Arms. Directors—Roy Roush, D. D. Walchier, and John Berger. Refreshments wound up the evening.

● **OLD BALDY CHAPTER, Pomona, Calif., July 19**—At this regular monthly dinner meeting, the following officers for the year were installed by J. Pat Riley, past State

ALL NEEDED CONTROLS

FOUND IN THE CUTLER-HAMMER REFRIGERATION REPLACEMENT LINE

Sixty percent of all refrigeration control replacement requirements are met by one Cutler-Hammer control alone... the *Universal Replacement Unit*. And where specific control is needed, that need is met by *Exact Replacement* control items in the C-H line, each individually packed, clearly labelled, complete with dial plate mounting screws, trim washers and full instructions for mounting and adjustment.

The practical advantages gained are: less capital tied up in stock; rapid and regular turnover; speedier completion of each job; greater all-round satisfaction. And in each C-H Replacement unit you will find the results of a 50-year specialization that had led to acknowledged leadership in the control field. Thus, outstanding refrigeration wholesalers recommend C-H Replacement Control and alert service organizations everywhere feature and use it. CUTLER-HAMMER, Inc., 1363 St. Paul Ave., Milwaukee 1, Wisconsin.

Bul. 9521N9 ➤

THIS ONE UNIVERSAL UNIT ALONE COVERS 60% OF ALL NEEDS ADJUSTABLE MOUNTING BRACKETS

Maximum Mounting Centers 4-3/16

Minimum Mounting Centers 2-3/16

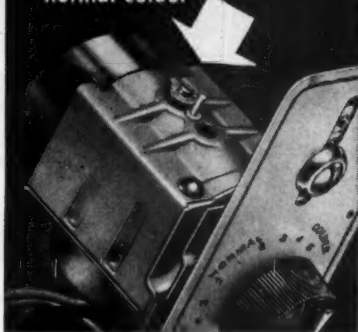
Adjustable Cutout Feature—Differential can be increased 4 degrees by turning indicator in "Hi" direction and decreased 4 degrees by turning in "Lo" direction.

Adjustable Range—Turning screw clockwise lowers setting and counter-clockwise raises settings.

Operating knob can be adjusted to meet various evaporator scale settings. New knob



4 degree external differential adjustment either side of normal cutout



is ideal for varying shield thicknesses. Makes this control adaptable to wider range of single dial replacement jobs where overload is not required in unit.



DOMESTIC, SEMI-COMMERCIAL AND COMMERCIAL CONTROL



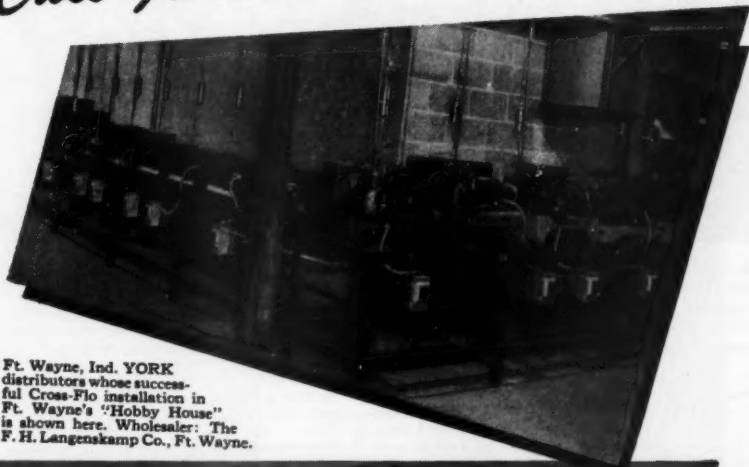
Lions Gate Chapter, Vancouver, B. C., was presented with their charter by Interprovincial Director Carl Heilig on May 28. Officers shown in the top picture are, left to right, seated: G. W. Hambling, 1st Vice-President; Carl Heilig, Interprovincial Director; A. M. Campbell, President; and A. G. Smail, Secretary. Standing: R. A. Paton, 2nd Vice-President; K. B. MacLeod, Entertainment Chairman; I. Morris, Educational Chairman; F. A. MacDonald, Treasurer; and W. McMillan, Sergeant-at-Arms. The lower picture is a partial view of those who attended the dinner which preceded the charter presentation.

President of CARSES: Darrell R. Smith, President; Van Cleveland, 1st Vice-President; Bill Chase, 2nd Vice-President; R. E. Ready, Secretary-Treasurer; and R. L. Callaway, Sergeant-at-Arms. Board of Directors—Harry Hollingsworth, W. T. Cook, R. T. Welch, and J. R. Wilcoxon. After a lengthy discussion on the merits of safety in the application of refrigeration service and installation work, President Smith appointed Harry Hollingsworth and Alvin Goss as a committee to institute a safety program for the coming year. The chapter takes great pride in the fact that one of its members, Hal Crumly, is the State Educational Chairman of the CARSES.

● **PEACH CHAPTER, Macon, Ga., July**—New officers were elected as follows: W. R. Wall, President; J. M. White, 1st Vice-President; J. M. Scarborough, 2nd Vice-President; J. H. Boggs, Secretary; Herbert Fowler, Treasurer; W. E. Norton, Sergeant-at-Arms; W. R. Wall, Educational Chairman; and John Crawley, Social Chairman. A short talk was then given by Mr. Wall on the subject "Safety in Handling and Charging Refrigerant Drums."

● **SCIOTA CHAPTER, Marion, Ohio, June**—Chapter officers for 1948-1949 are C. W. Osmun, President; Earl Scheerer, Vice-Presi-

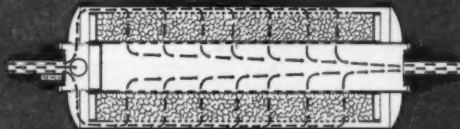
'Cross-Flo' EXCLUSIVELY FOR *HOSLER & PEARSON



* Ft. Wayne, Ind. YORK distributors whose successful Cross-Flo installation in Ft. Wayne's "Hobby House" is shown here. Wholesaler: The F. H. Langenskamp Co., Ft. Wayne.

REMCO HEAVY DUTY *Cross-Flo* DRIER-FILTERS

Carried in stock by
leading wholesalers
everywhere



Yes, in installations such as the one pictured, Cross-Flo Drier-Filters entirely eliminate clogging and pressure drop, proving them to be the industry's most efficient heavy-duty commercial drier-filters. Cross-Flo's extra large highly-efficient filtering element—the exclusive new principle of flowing the refrigerant slowly across the bed of drying agent instead of forcing it through a long, clogged bed—allows the user to permanently forget any moisture problems. That's why the name Hosler & Pearson is now added to the fast-growing list of *exclusive* Cross-Flo users.

Diagram below shows Cross-Flo's principle of flowing the refrigerant uniformly through the outside course-filter then slowly across the large cylindrical bed of drying agent, finally flowing slowly through the extra-large highly-efficient filter.

— CAPACITIES —

LIQUID LINE: $\frac{1}{4}$ to $7\frac{1}{2}$ HP
LOWSIDE: $\frac{1}{4}$ to 15 tons Freon-12
SUCTION LINE: $\frac{3}{8}$ " to $\frac{1}{2}$ " O. D.

REMCO

INCORPORATED
ZELIENOPLE, PENNSYLVANIA

Send for Circular 711-A for all the facts about temperature effect on drier-filter performance.



The last Spring meeting of the Cleveland Auxiliary was a dinner party held at the Sweden Manor, with the twenty-six ladies pictured above in attendance. The table was beautifully decorated with a center piece in the form of a large straw hat filled with flowers and trimmed with a pink satin bow. Pink candles were held by crystal star shaped holders, and the favors were in the shape of sprinkling cans. Entertainment and a radio drawing followed the dinner. Meetings will be resumed in September.

dent; L. B. Morse, Secretary; and Byron Swartz, Treasurer. Board of Directors—Howard Garey, Chairman, Robert Pence and Donald Taft. Mr. Osmun appointed the following committee chairmen: Earl Scheerer, Entertainment; Chas. Morse, Investigating; Alfred Weber, Educational; and Walter Osmun, Publicity. Delegate to Buckeye State Assn. is 1st—Earl Scheerer, and 2nd—John Sycks.

● **SUNSHINE CITY CHAPTER, St. Petersburg, Fla., June 3**—This was the night to elect new officers, and the following were voted to serve for the coming year: W. J. Godfrey, President, R. V. Money, Vice-President, R. LaPlant, Secretary; Phil Baird, Treasurer; C. B. Hewlett, Sergeant-at-Arms; and Mote Baird, Chairman, Educational Committee.

● **TOLEDO CHAPTER, Toledo, Ohio, June 9**—Mr. Cadwell, Divisional Manager of Universal Cooler Corp., Mr. Hull of International Detrola Co., and Mr. Crousher of Universal Cooler Corp. service department, were present to give a lengthy and very interesting educational program on Universal refrigeration. Another guest speaker was George Schuld, safety engineer from Cleveland, Ohio, who gave a talk on safety in service work.

● **TRI-COUNTY CHAPTER, Aurora, Ill., June 19**—The educational program, in charge of Dick Marquis, was a tour through the Western United Gas and Electric Company generating station, conducted by B. R. Wilkenson, chief operator of the station. Mr. Wilkenson divided the chapter into groups of five members and one engineer so that each man would get the utmost out of the tour which was 2½ hours of very interesting sights and discussions. Some of the points of interest were as follows: present coal consumption per day is 12 tons; when the wind is at a high velocity the loss of coal blown away reaches as high as 6 tons per day; the new boiler has a 1325 psi. and temperature at 900 degrees. This steam goes into the large

turbines, then the discharged steam at 320 psi.—625 degrees runs the other turbines. Water used per day is sixty million gallons. This water is drawn from and returned to the river. 125 employees operate the plant on three 8 hour shifts.

Ladies Auxiliary

● **KANSAS CITY AUXILIARY, Kansas City, Mo., July 15**—The raffle gift of an aluminum bun warmer, donated by Hazel Brown, was won by Nadine Brown. It was suggested that a "Put and Take Box" be made for donations made by members for future meetings. A number of games were conducted by Mrs. Taylor. Winners included Katherine Andrews, Katherine Jones, Hazel Brown and Nadine Brown. Refreshments were served to approximately 30.

● **LONG BEACH AUXILIARY, Long Beach, Calif.**—This Auxiliary has been busily engaged in philanthropic work with the Los Angeles General Hospital and the California Guide Dog School, both of which depend upon public generosity. A copper tooling class was started and in addition, many of the Auxiliary members have been making children's toys and clothes for the inmates of the Los Angeles General Hospital. This requires them to work many evenings as well as at the meetings. After the July meeting, which was held at the home of Mrs. Pat Riley, a hamburger fry was put on later in the evening. Badminton and volley ball were played and an enjoyable time was had by all. A rummage sale is planned for September.

● **NIAGARA FRONTIER AUXILIARY, Buffalo, N. Y., May**—In the way of entertainment for the fall, a hard-times dance was suggested and discussed. Plans for the fall rummage sale were also brought up. A motion was made and seconded that this be held September 28 and 29. A new member of the Auxiliary is Mrs. Van Derwalker.

FOR MAXIMUM
REFRIGERATING EFFICIENCY

Specify

STANGARD

PRIME SURFACE COLD PLATES



- STANGARD plates are made for various applications, in any size, shape or form, including stainless steel —
- PROMPT attention is given to new orders, with delivery schedules assured —

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46-76 Oliver Street • Newark 5, N. J.

NEWS OF THE EQUIPMENT INDUSTRY



Dennis Has Grand Opening

FRIDAY, July 30, at Omaha and Monday, August 2, at Sioux City were designated as grand opening days for the Dennis Refrigeration Supply Company. The company is now occupying its new homes at 2917 Douglas St., Omaha, and at 609 Perry St., Sioux City, Iowa.

Everyone was invited to attend the grand opening in these two localities where refreshments and door prizes to the extent of several hundred dollars in merchandise including a grand prize of a 1/4 hp. condensing unit, were given away. The two new homes are modern in every respect and are considered the largest in the midwest.

This is one more milestone in the growth of a company that continually endeavors to increase its facilities to the refrigeration trade.

★ ★ ★

REMA and REWA to Meet at French Lick

PRELIMINARY plans for the joint meeting of the Refrigeration Equipment Manufacturers Association and the Refrigeration Equipment Wholesalers Association at French Lick, Ind., on October 21, 22 and 23, were more nearly complete as a result of a meeting of the two planning committees in Chicago on July 16.

Both REMA and REWA will hold a meeting of its Board of Directors on Wednesday afternoon, October 20, with a discussion of mutual problems over the dinner table.

Thursday morning, October 21, will be left open for golf and to allow those attending from the east to get in by train.

A general membership meeting is scheduled to begin at Thursday afternoon, with a cocktail party by REMA planned for the evening.

A joint program beginning at 9:30 Friday morning, October 22, will fea-

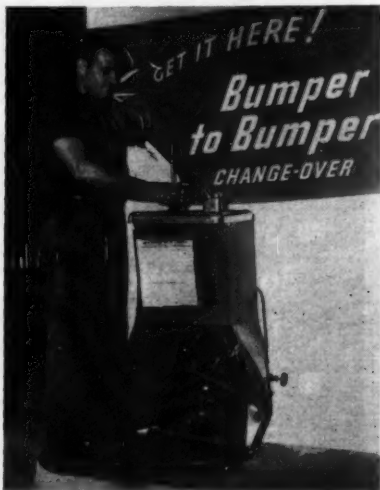
ture two speakers from REMA and two from REWA followed by discussion periods on problems affecting both groups.

A golf tournament is planned for Friday afternoon with an evening banquet scheduled for 7 o'clock.

Saturday, October 23, will be devoted to product section meetings.

The planning committee found many changing and vital conditions facing both wholesalers and manufacturers and are working out a carefully planned program to bring these matters up for discussion.

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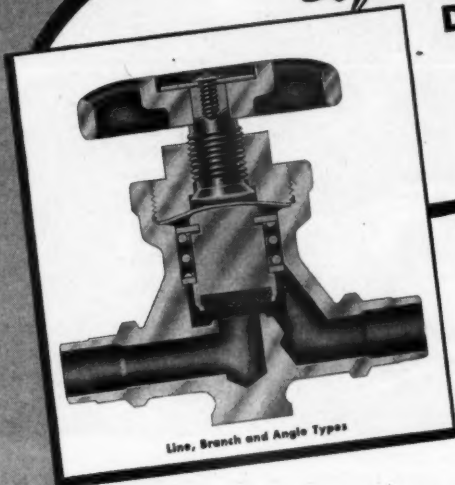


This smashed Oasis electric drinking water cooler continues to serve 50-degree cooled water after a motorist drove his car squarely into it. The cabinet was smashed open, the insulation was ripped out, the fan was knocked off, the control knob was destroyed, the line attaching to the water control valve was flattened, and assorted other damage was caused—but the Oasis continued to cool water! This picture of a service station employee drawing a drink from a glass filler attachment was made only a few minutes after the smash-up.

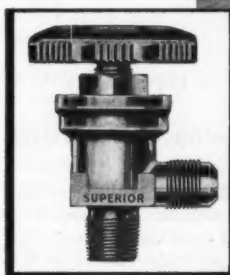
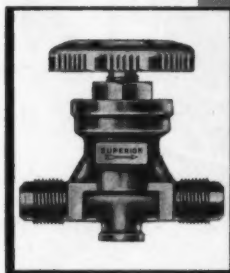
Life-Time



DIAPHRAGM PACKLESS VALVES



Line, Branch and Angle Types



10 FEATURES OF SUPERIORITY—Check them!

- 1—Rugged—pleasing appearance—symmetrical design
- 2—Wrench pads for individually tightening flare connection.
- 3—Unique solder connections permit soft or silver soldering—without removing internal assembly
- 4—One-piece, plated lower stem
- 5—Controlled stem travel assures "Life-time" diaphragm performance.
- 6—Controlled seating results in "Life-time" operation
- 7—Large bearing surfaces—polished stem heads, and scientific lubrication assure "Life-time" performance of upper stem and diaphragm.
- 8—Unrestricted flow—ease of operation
- 9—Operates under normal pressure, with flow in opposite direction.
- 10—No special tools required for disassembly or reassembly

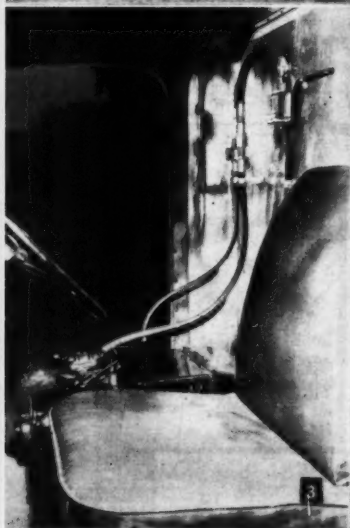
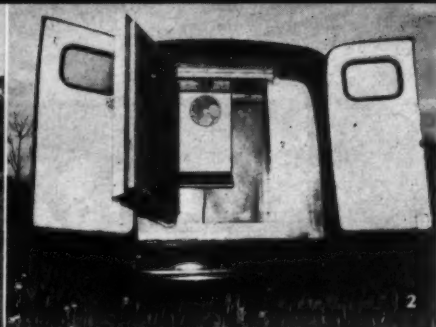
Ask Your Jobber About "Life-time" Packless Valves
They're SUPERIOR!

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Superior Valve and Fittings Co.



1509 WEST LIBERTY AVE., PITTSBURGH 26, PENNA.
OFFICES IN PRINCIPAL CITIES STOCKS: CHICAGO (6) • LOS ANGELES (15) • JOBBERS EVERYWHERE



New Truck

Refrigeration System

REFRIGERATED trucks of all types—from the small panel job for local hauling of meats, ice cream, flowers, or frozen foods to the largest highway semi-trailer for inter-city transport—can derive benefits and savings from a new truck refrigeration system being introduced by Coldmobile Company, Detroit, it is claimed.

Known as the "Coldmobile System," its chief feature is that it is powered directly off the truck's 6-volt electrical system and uses standard refrigeration equipment, with the exception of the 6-volt motor to drive the unit.

(1) Typical application of the "Coldmobile System" is in a panel truck such as this for distributors of meat, ice cream, flowers, frozen foods, etc. (2) Standard panel type blower coils may be employed as indicated in this rear view of an installation. (3) The refrigeration condensing unit can be mounted on the floor of a panel delivery truck right beside the driver's seat. On the bulkhead at upper right are the thermostat and the thermometer. (4) A special generator which replaces the standard truck generator and mounts in the same place furnishes the power necessary to drive the refrigeration unit and the truck electrical system. On the largest models, the generator is driven by a power take-off from the transmission.

This is believed to be a new development in the field of truck refrigeration, according to Coldmobile officials, who say patents have been applied for.

The additional electrical power necessary to drive the condensing unit motor is supplied by a special 6-volt generator, which is also connected to the truck electrical system.

This generator replaces and mounts in the same position as the standard "low output" generator supplied as standard equipment by truck manufacturer. Due to its unique design, the special generator provides a constant

IT'S NEW!!

IT'S IMPROVED!!

IT'S A TIME SAVER!!



PART #C3

\$1.95

Pat.
Pend.

WATSCO

REPLACEMENT CHECK VALVE

**For Cold Spot
& Bohn Units**

A boon to refrigeration repairmen. Wagner Tool & Supply Corp., of Long Island City, N. Y., Manufacturers of "WATSCO" products, announces a newly improved replacement check valve for Coldspot and Bohn direct drive units.

The check valve assembly is completely self contained in an all brass housing that has an extended portion $\frac{1}{2}$ inch long by .3155 diameter, this is driven into the $\frac{5}{16}$ " opening of the original check valve seat, thus forming a pressed fit.

This cartridge type of construction offers a number of decided advantages — eliminates the need of lapping or grinding — can be quickly installed or removed through the upper part of the unit — tested and calibrated at the factory — the only tool required is a standard threaded $\frac{5}{16}$ " bolt.

Or you can use our Special Tool #P4, only 30c

If your wholesaler cannot supply you,
order direct from us.

Write for Our Free Descriptive Circular

**SPEED REPAIRS AND REDUCE
COSTS WITH WATSCO**

other Watsco products:

- **TERMINALS**
- **FLAPPERS**
- **VANES**
- **TOOLS, ETC.**

Wagner

TOOL and SUPPLY CORP.

1300—43rd Ave., Dept. RE, Long Island City 1, N. Y.

source of power for driving the refrigeration unit as well as the vehicle's electrical system over the broad range of motor speeds from idling to top driving speed.

The "Coldmobile System" is available in sizes from ¼ up to and including 2 hp. for both low and high temperature applications in all sizes of trucks.

On sizes above 1 hp., the special generator is operated through a power take-off from the truck or tractor transmission instead of off the fan belt. On sizes above ½ hp. a combination 6 and 12 volt system is employed.

To place the unit in operation it is merely necessary to start the truck engine and flip a toggle switch on the dashboard. A conventional thermostatic control is employed to control the operation of the refrigerating unit.

On high temperature applications (above 32°) defrosting is automatic after each "on" cycle.

Accessory equipment to be made available includes a kit which permits plugging in the refrigeration unit to standard 110-volt a.c. current for standby or overnight refrigeration requirements. This would make it unnecessary to unload the truck at the end of the day's run.

A typical installation in a small panel truck mounts the condensing unit conveniently on the floor of the cab beside the driver. Where a custom-built insulated body on a cab and chassis is used, the condensing unit may be suspended beneath the body on one side of the truck. The same method could be used on semi-trailers, or the unit could be mounted in the nose of the trailer.

Refrigerant lines between the condensing unit and the unit cooler are flexible and are fitted with self-sealing couplings. These make possible quick substitution of a replacement condensing unit for one in need of service with no loss of refrigerant, or admittance of air to the system. Because of this feature the installation of this unit does not require the services of a skilled refrigeration mechanic.

Conventional refrigeration equipment is used throughout, the only major change being the use of 6-volt motors to drive the condensing unit and the unit cooler fan, plus some reinforcement to withstand road shock.

The "Coldmobile System" was developed by Henry O. Kirkpatrick, who recently resigned as Chief Engineer of Advance Manufacturing Company, Detroit, producer of truck refrigeration systems.

Distribution will be handled through a nation-wide dealer organization, Kirkpatrick said.

★ ★ ★

Controlled Cold Keeps Dairy Products Fresh in Transit

A 'CONTROLLED cold' principle featuring engineered-to-the-job truck refrigeration makes door-to-door delivery or long hauls of dairy products equally practicable, truckers report.

This system protects perishables in transit by using Kold-Hold Hold-Over truck plates—leak-proof steel shells enclosing a refrigeration coil and a freezing solution. Flint ice is formed in these Hold-Over plates by connecting them to the existing plant compressor at the end of a day's run. In the morning these connections are broken and the charge of ice, built up overnight, protects the load for the entire day. Another method of charging is by a gas or electric powered compressor mounted on the truck which generally operates continuously with the truck. Kold-Hold recently introduced a completely self-contained truck "packaged" refrigeration unit that requires little installation fitting. This model recharges merely by plugging into any standard 110-volt electric outlet.

Temperatures as low as zero are held up to twenty hours as Kold-Hold's sealed-in flint ice melts. The number of Hold-Over plates needed depends upon the insulation and size of the truck body, the product hauled, interior temperature desired, and the number of delivery stops. One owner of a Kold-Hold-equipped delivery truck, making an average of seventy stops daily, reports that ice cream is as firm at the end of his route as it is at the beginning. Unsold produce is left in the truck while the Hold-Over plates are recharged, thereby cutting handling costs.

The refrigerating solution is sealed-in, preventing formation of moisture which causes rust and deterioration of truck bodies. Users say Kold-Hold Hold-Over

APPLIANCE TESTER

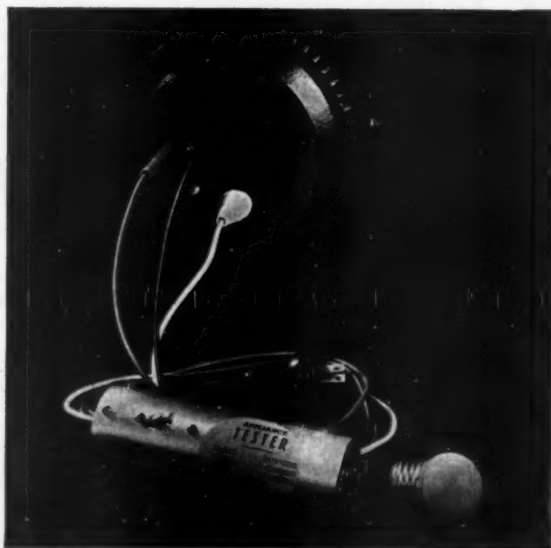


A genuine instrument for men doing refrigeration maintenance work, trouble shooting, or general field service.

So small and compact it can be carried in your pocket.

CHECK ITS MANY USES

- ★ Manual Test Relay for Refrigerator Motors.
- ★ Continuity Tester for Motor Windings.
- ★ Ground Testing for Motors and Wiring.
- ★ Makes Quick and Simple Hook-up for Reversing Hermetic Motors to Free Stuck Units.
- ★ Test Cord for Any Appliance.
- ★ Capacitor Tester.
- ★ Makes Temporary Outlet Socket.
- ★ Pilot Light, Thermostat, Motor & Wiring Tester for Gas and Oil Furnaces.



The tester is shown here with heavy guarded clips attached to a hermetic unit.

Versatility - Capability - Service

AN INSTRUMENT YOU CAN DEPEND UPON!

A simple, practical instruction sheet, which includes color charts for the most popular hermetics, is furnished with each tester.

Price: \$7.50 (Less bulb & fuse)—Order from your wholesaler or write to

TESTER SALES CO.

P. O. BOX 3386

W. AKRON STATION, AKRON, OHIO

SERVICE ENGINEER

95

August, 1948

truck plates keep perishables fresh more economically than any method they've used—for an average cost of less than a dime a day.

★ ★ ★

Utilities Offers Advance Training for Servicemen

UTILITIES Engineering Institute has announced scheduling of the fall quarter in resident air conditioning, commencing September 27. Designed to fit the needs of men with refrigeration background, U. E. I.'s resident school offers training at and above the maintenance and operational levels. Basic science theory is combined with practical application to provide a comprehensive knowledge of the air conditioning field. Mathematics, Thermodynamics, Drawing, Air Conditioning, Principles and Shop, Welding, and Air Conditioning Design are presented in related sequence.

The course consists of 24 weeks of intensive classroom and shop work divided into four periods of six weeks each. Classes are held five hours per day, Monday through Friday.

Registration is now opened to qualified men with refrigeration background. Approved for veteran training, it is also open to civilians. Further information is available on request by writing the Registrar, Utilities Engineering Institute, at 2525 North Sheffield, Chicago 14.

★ ★ ★

Reduction in "F-22" Price

A REDUCTION of approximately ten per cent in the price of "Freon-22" fluorinated refrigerant was announced recently by Kinetic Chemicals, Inc.

The price cut—fourth for the material in three years—will be effective with July 26 shipments.

The reduction was a reflection, company officials pointed out, of economies of greater production made possible by the increased manufacture of refrigeration and air-conditioning equipment designed to use "Freon-22". Further lowering of the price in the future, they said, may result if the present trend toward wider use of the material continues.

Equipment using "Freon-22" instead

of other refrigerants, the company reported, is being increasingly used to obtain more efficiently the lower temperatures required for locker plants, for the faster freezing of foodstuffs, to raise the production of mechanical freezing units, and for home and farm freezers.

At the same time, the company said, "Freon-22" is now being used in many low-temperature industrial applications as well as in air-conditioning units. The material also is an intermediate in the manufacture of "Teflon" tetrafluoroethylene resin.

★ ★ ★

Hypothermy Unit For "Cold" Surgery

A PRODUCT developed by a Buffalo man is attracting attention in the medical world. Called the hypothermy unit, it is a machine for human refrigeration and is used in "cold" surgery and medical treatment. Its inventor is Eugene L. Barnes, vice president of the Therm-O-Rite Products Co., which makes it. The company has already filled an order from the Veterans' Administration and is now filling another for \$12,694. It has shipped its product to several big hospitals in the U. S.

★ ★ ★

Heating, Air Conditioning and Refrigeration Students Organize Scientific Society

STUDENTS majoring in heating, air conditioning and refrigeration have organized Beta Tau Upsilon at Walter Hervey Junior College, New York City, to function as a scientific society and promote interest in their chosen fields.

Ralph Scoverling, of Bay Park, New York, has been elected president of the group which has an initial membership of sixty-five. Mr. Scoverling stated that meetings will be held weekly in the air conditioning laboratory at Hervey Junior College.

It was also announced that a faculty advisory staff composed of Charles Broder, air conditioning consultant and instructor; and Charles Burkhardt, heating instructor, has been appointed.

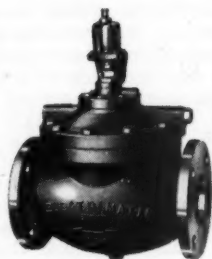
Beta Tau Upsilon plans to publish a monthly bulletin of activities in three fields as they concern the students. In addition, the new society will sponsor a series of six lectures on heating, air



Type WP



Type WK



Type WJ

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WATER REGULATING VALVES

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Heading for work in air conditioning are these men, students in the Air Conditioning department of Dunwoody Industrial Institute in Minneapolis, Minnesota, and part of the 5,790 who have been receiving trade training there during the past year. In the day school regular pre-employment training, 3,022 attended, and in the evening school extension training, 2,768.

Shown with the students is Herbert Pierson, department head, ninth from the left in the front row. Also shown in the front row are the instructors who teach general air conditioning, refrigeration, sheet metal, and warm air heating and ventilation courses.

In their quest for job knowledge, students at Dunwoody put in 1,949,847 hours of training. They came from Minnesota and 38 other states, and these foreign countries: Canada, Hawaii, British West Indies, Venezuela, Brazil, Porto Rico, Panama, Iceland, France, Alaska, Mexico, Costa Rica, Columbia and the Philippine Islands. Dunwoody will begin its 35th year of training men for trade work with the re-opening of school in August.

conditioning and refrigeration. Engineers in these fields will speak at the lectures.

The first lecture, scheduled for July 21, will present Chris Jensen and James W. McGuire, of the Perfex Control Corporation, who will speak on "Heating Controls."

★ ★ ★

HONEYWELL-BROWN ANNOUNCES MONTERREY, MEXICO, BRANCH

THE Mexican subsidiary of the Minneapolis-Honeywell Regulator Company has opened a branch office at Monterrey, William H. Westphal, manager of the company's international division, has announced.

Honeywell-Brown S. A., Mexico, D. F., was incorporated a year ago with headquarters in Mexico City. The Monterrey office is the first branch to be opened by the subsidiary. Increasing industrial activity in northern Mexico, and the attendant need for automatic controls of the type made by Honeywell-

Brown were determining factors in establishment of the new branch, Westphal said.

Francisco B. Rocha, has been placed in charge of the Monterrey branch. He was transferred from the Mexico City office after completing a training course in the use and operation of Honeywell-Brown instruments and control systems.

Address of the new office is Pino Suarez 486 Sur on the main Laredo-Mexico City highway.

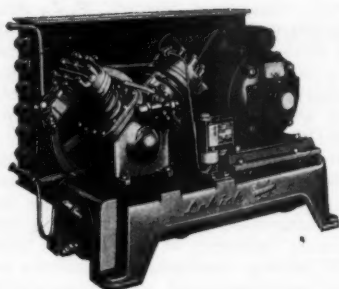
The territory covered by the branch includes the states of Nuevo Leon, Tamaulipas, Coahuila, Durango, Zacatecas, San Luis Potosi and Chihuahua.

★ ★ ★

Kelvinator Opens Seattle Branch

ESTABLISHMENT of a new Kelvinator factory zone at Seattle and the appointment of W. R. Gunberg as zone manager was announced recently by C. T. Lawson, vice-president of Nash-Kelvinator Corporation in charge of Kelvinator sales.

Gunberg, who has been Kelvinator



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Air and Water Cooled

For High, Medium or Low Temperature Freon—12 or Methyl Chloride.

- ★ **PACKAGED AIR COOLED**
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1/3 H.P. 1/2 H.P. 3/4 H.P.
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1/3 H.P. 1/2 H.P. 3/4 H.P.
1 H.P. 1 1/2 H.P. 2 H.P.
- ★ **HEAVY DUTY WATER COOLED**
1/2 H.P. 3/4 H.P. 1 H.P. 1 1/2 H.P.
2 H.P. 3 H.P. 5 H.P.
- ★ **COMBINATION AIR AND WATER COOLED**—1/2 Through 2 H.P.

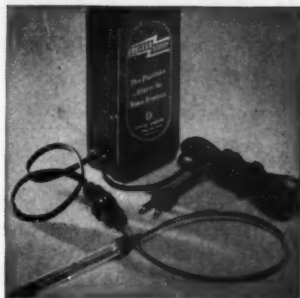


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branch manager at Newark, N. J., since 1945, entered the appliance field in 1925 as a salesman. In addition to operating his own dealership for several years, Gunberg has held executive field positions with leading appliance manufacturers for nearly 20 years.

He is succeeded as branch manager at Newark by Bruce Beveridge, branch manager at Baltimore. Beveridge became associated with Kelvinator in 1937 as retail salesman at the Detroit zone, later joining headquarters staff as regional representative, and subsequently going to Baltimore in 1944.

C. S. Raugh, district manager at Cleveland, has been named new branch manager at Baltimore. With an extensive background in retail appliance selling, Mr. Raugh joined Kelvinator at Pittsburgh in 1939 as zone representative, transferring to Cleveland when he returned from service with the U. S. Signal Corps.

★ ★ ★

Wilson Plans Early Production Following Plant Unit Blaze

PLANS for early resumption of production following the fire which destroyed Plant No. 1 of the Wilson Cabinet Company on Wednesday July 14th have been announced by John E. Wilson, Jr., president of the Smyrna, Delaware, company.

Mr. Wilson said plans were going for the immediate setting-up of production lines in the company's new modern warehouse, where nearly 75,000 square feet of floor space is available. It is expected that production of some products will be restored within thirty days.

Plant No. 2 of the Wilson company where all sheet metal and wood parts are fabricated is a building of fireproof construction and did not burn. Also Plant 3 including wood working machinery and lumber supplies, were saved and remain intact.

Nine fire companies fought the fire in Plant 1 which raged for three hours through the main assembly plant, the parts department and the administrative offices. According to Mr. Wilson the loss to Plant No. 1 and contents amounted to about one million dollars mostly covered by insurance.

The Wilson Co. are manufacturers of

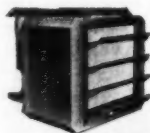
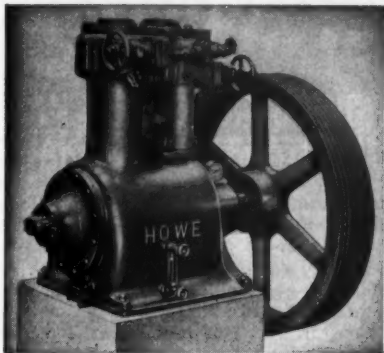
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Farm Milk Coolers, Home and Farm Freezers, and other commercial refrigeration products. Sales are handled through a national distributor and dealer organization by Wilson Refrigeration, Inc.

★ ★ ★

Copeland Earnings

BOLSTERED by third quarter earnings moderately above those of the corresponding 1946-47 fiscal period, net income of Copeland Refrigeration Corp. for the nine months, ended June 30, last, of its 1947-48 fiscal year amounted to \$452,169, equal to 75 cents a share on 600,000 outstanding common shares, contrasted with \$482,022, or 80 cents a share, in the like nine months of the preceding fiscal year, Harry E. Thompson, president, announced recently.

Net sales of Copeland products, compressor and condenser units, household refrigerators and water coolers, were at a record high for the nine months at \$9,853,112, up more than 25 per cent from the previous peak volume—\$7,826,724—shown in the corresponding period a year previously. Absorption of increased material, labor and overhead costs through "effective pricing," according to Mr. Thompson, reduced pre-tax earnings to \$752,169 from \$803,370 a year ago, while provision for Federal income taxes totalled \$300,000, against \$321,348.

★ ★ ★

Refrigeration Engineering, Inc. Wins Appeal in Patent Suit

CULMINATING a long suit brought by York Corporation to have the patent on the Water Defrost method of refrigeration declared invalid, the United States Circuit Court of Appeals for the Ninth District recently handed down a decision in favor of Refrigeration Engineering, Inc. of Los Angeles, California, holders of the patent covering Water Defrost Coils.

The decision of the appellate court climaxes several years of litigation and modifies the decision of the lower court which held that only one of the claims made by Refrigeration Engineering, Inc. were valid. In their decision, which was reached on June 29th, the Circuit Court of Appeals not only upheld the decision

of the U. S. District court, but reversed the ruling of this court and ruled that two additional claims, not allowed by the lower court, were valid.

The York Corporation, who have been manufacturing Water Defrost Coils for many years, brought action in the United States District Court to disprove claims made by Refrigeration Engineering, Inc. with regard to the patent covering "Recold" Water Defrost Coils and the method of using ordinary tap water to defrost coils. In the action they asked for a judgment declaring the patent to be invalid.

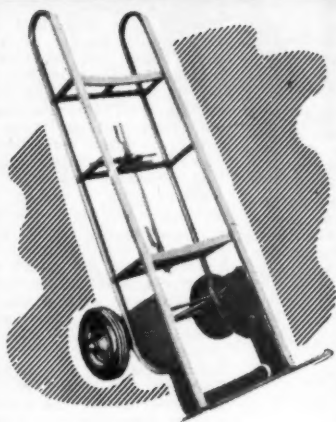
The Recold water defrost method consists of a combination of essential elements (a coil, a spray head over the coil, means of supplying water to the spray head, a self-draining conduit leading from the spray head to a point outside the refrigerated space, a drip pan under the coil, and a conduit leading from the drip pan to a point outside the refrigerated space), all of which are used to make up the "Recold" Water Defrost Coil.

The coil can be defrosted while maintaining, within the refrigerated space, a temperature below freezing. This is done by supplying water from a source outside the refrigerated space to the spray head, whence it is sprayed on the coil, caught in the drip pan, and drained therefrom by one of the conduits. Unused water remaining in the spray head is drained by the other conduit. By these conduits all water is removed from the refrigerated space without being frozen and without materially affecting the temperature of such space.

The original trial of this case was held the latter part of 1946 before the United States District Court. The decision of this court found that Claim Number 13, was valid and held that York Corporation had infringed the patent. Other claims made by Refrigeration Engineering, Inc. were held to be invalid.

The decision handed down by the United States Circuit Court of Appeals for the Ninth District, affirmed the ruling of the District Court holding claim Number 13 valid and infringed. It also held claims Numbers 10 and 11, including essential elements of the invention, were valid. Therefore the judgment of the lower court was modified so as to hold both of these claims valid.

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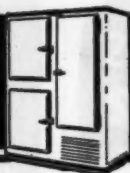
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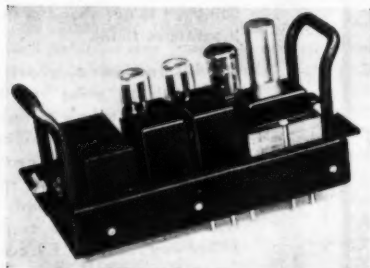
Information in this department is furnished by the manufacturer of the article described and is not to be construed as the opinion of the Editor.

Electronic Controls

A NEW air conditioning control system, claimed by the manufacturer to be 100 times more sensitive than existing controls and containing no moving parts in its thermostats, has been developed by the Minneapolis-Honeywell Regulator Company.

than a year of rigid tests in the laboratory and in actual application, he said.

Flexibility of the system and its inherent simplicity were listed by Locke as important advantages made possible by the electronic circuits. Single thermostats can be used for both heat-



Forecasting a new era of comfort and increased operating efficiency in the heating, ventilating and cooling of factories, office and commercial buildings, the new system employs the science of electronics to achieve results heretofore unattainable in the air conditioning industry, according to James S. Locke, manager of the company's commercial controls division.

Now in production, the control system was developed after six years of research. It is based on the same electronic circuits already proven in other Honeywell controls including the C-1 and E-6 autopilot standard on all Air Force four-engine bombers, domestic heating control and the electronic heating and air conditioning control system for railway passenger cars. The new controls have successfully passed more

ing and cooling with automatic change-over from one to the other at any selected temperature level. Averaging thermostats located throughout a large area to control temperature also may be added to the system as easily as additional electrical lights can be added to electrical circuits, Locke said.

An important feature of the new control is the ease with which compensators may be added to change inside temperatures in accordance with outdoor temperatures. In the case of summer cooling, inside temperatures may, if desirable, rise along a pre-selected scale in proportion to the rise in temperature outdoors, he explained. In the case of heating, inside temperatures may rise as outdoor temperatures fall, also in accordance with a pre-selected scale.

The extreme sensitivity is

due to the fact that the thermostats consist of very small mass. Lag is eliminated because the electronic relay is capable of taking small signals from the thermostat coils and building them up into a force sufficiently powerful to operate the control motors.

Essentially, he stated, the new air conditioning control operates on the known physical fact that the electrical resistance of the small coil of wire used in the thermostat changes with a change in temperature. The electronic relay can interpret a change in temperature of hundredths of a degree. Through the tubes of the electronic relay, the change can be measured and amplified into an electrical current powerful enough to operate the control motors which, in turn, position the valves and dampers of the heating, ventilating or air conditioning system under control.

The basic units of the new control include a room thermostat, duct and immersion thermostats, an electronic modulating motor and an electronic relay. Additional thermostats and motors may be added to the control system in accordance with the size of the area under control, Locke said. Because extremely low voltages are used, wiring of the system is greatly simplified in comparison with controls in use today.

Because there are no moving parts such as contacts, wipers, bellows and bi-metal elements of the kind used in standard thermostats, maintenance of the electronic system is reduced to a minimum.

The tubes used in the amplifier unit are standard radio tubes which, because they operate well below their design load, will function for several years at a minimum before they need changing. The amplifier itself may be easily removed for servicing.

FOR A COMPLETE RANGE OF SIZES

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condensing units
there's one for
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SNAP-ON COPPER TUBE CLIPS

FIT SNUG-HOLD TIGHT - while both hands are free to work



VAN type HANGERS

Use for extra neat installation—made of all copper for tube sizes $\frac{1}{2}$ " $\frac{3}{8}$ " & $\frac{1}{4}$ " O.D. and pipe sizes $\frac{1}{2}$ " $\frac{3}{8}$ " & $\frac{1}{4}$ "

STRAP HANGERS

Made of $\frac{1}{2}$ " brass strip—Adjustable for all sizes of tubing or pipe, $\frac{1}{4}$ " O.D. and up.

BRASS STAPLES

Handy for a score of uses, especially for radiant heat installations.

A MACO exclusive in new-design tube straps that "snap" on and hold by themselves, leaving both hands free. Available for $\frac{1}{4}$ " thru $2\frac{3}{4}$ " O. D. tube sizes.

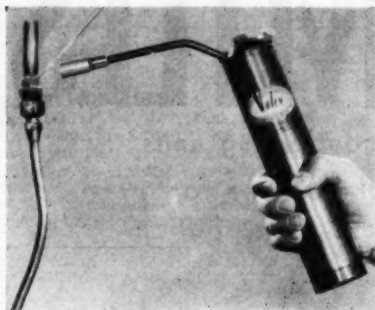
These and other MACO products are available through leading wholesalers, everywhere. Literature and prices available upon request.

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MADISON PRODUCTS COMPANY
EAST GREENWICH, R. I.

Torch

WEIGHING only two pounds, including capacity load of fuel, the new Vulco heating and brazing torch, for use on hard or soft solders, will burn ten to thirteen hours on less than three cents worth of LP gas.

tific construction indicates the Vulco Torch will not "freeze-up" . . . no more spluttering, or dying. The fuel is converted into gas before it reaches the burner tube orifice, assuring perfect combustion.



Vulco Brazing Torch has no cumbersome hose, and starts immediately without pre-heating. The fuel supply, propane or butane, is carried in the 2 1/4 inch diameter body. An average size working flame will burn ten to twelve hours continuously, on one fuel filling—at a cost of less than three cents . . . 90% cheaper than acetylene. The calculated flame temperature is 3660° F.

The manufacturer points out that research and sci-

Triplett and Barton, Inc., testing laboratory, Burbank, California, regard the Vulco as exceptionally safe. Their tests indicate the torch will not burst even under extremely adverse conditions.

It will burn in any position without danger of overheating. Requires no maintenance, because there are no moving parts.

A blanket underwriters contract is carried on all torches with Lloyds of London.

in coils or in straight lengths. The stock lengths are 5 and 10 feet, but it can be had in other lengths. It will support pipes, cables and conduits up to a safe load of 500 pounds.

Minerallac Electric Company also makes hangers, straps, jiffy clips, insulating and cable-pulling compounds and volt-telling statiscopes.

Freezer Alarm

MODEL FA-300, smaller and less expensive than the original Model FA-200, is intended for application where the freezer is located relatively close to the living quarters, the signal being audible throughout the average small home.

Model FA-300 Enterprise Freezer Alarm incorporates



Hangers

THE Minerallac Electric Company, Chicago, Illinois announces the addition of two new products to its manufactured line of hangers, clips and straps. They are two-hole pipe straps of zinc plated steel and perforated strap of electro-galvanized steel. Both new products are available for immediate delivery.

Minerallac's new two-hole pipe straps are made of all new steel, selected for temper and hardness, they have ample strength and rigidity to support heavy loads.

The pipe straps are packed in standard cartons for maximum efficiency in stocking. They are also available in copper, everdur and alumi-

num, as well as zinc plated steel.

Minerallac's new perforated strap is a high quality precision made product. It is 3/4



inch wide by 18 gauge with 1/4 inch holes on 1/2 inch centers. Available also in everdur, copper, brass or aluminum, this strap can be furnished

buzzer signal line switch, test button, battery compartment and sensitive thermostat with 6 feet of capillary tube; all encased in sturdy aluminum housing. Operating temperature may be specified at either 15 or 25 degrees F. Alarm signal, at specified calibration, warns of above normal freezer temperature, while there is ample time for service, or transfer of food to other storage space, before spoilage occurs. Alarm, measuring 3"x3"x6", is wall mounted with single nail or screw and the capillary tube passed under lid and into freezer chest.

Battery powered signal, capable of long continuous operation, assures warning even in event of power failure, blown fuses, etc.

**For
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Refrigeration**

New
**K-20-5
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SELF ALIGNING VALVE GRINDING KIT

Now you can easily grind, finish and test recessed or flush valve seats (either piston or flapper jobs) . . . get 'em back into action *faster* . . . and make satisfied customers! No more tiresome hand-lapping.

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CLASS SHOP**

Another Premier Product
PREMIER LAPPING BLOCKS

Two 6" Lapping Blocks in Hinged felt lined wood box for safe keeping.

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891 Park Avenue

Baltimore 1, Md.

Truck Refrigeration

DEVELOPMENT of a fully automatic mechanical temperature-control unit for trucks and trailers has recently been announced by the Fruehauf Trailer Company.

The new unit, called the "Little Giant", is available in four models to meet the

test perishable cargo under any climatic condition.

Model LGHC is exactly the same as Model LGH except no heating unit is installed. Model LG is for smaller vehicles, with a body length up to 20 feet, and incorporates all of the features of the "Little Giant" line. However,



needs of various size vans for high and low temperature hauls. Model LGL is designed for bodies from 20 to 34 feet in length with six inches of insulation, to maintain a temperature range from zero to 30 degrees, Fahrenheit. Model LGH is for the same size van with three inches of insulation and will maintain constant temperatures of 30 degrees and above. Both models feature automatic defrosting and a thermostat-controlled heater that will change-over from cooling to heating as outside temperatures vary. This feature enables a hauler to pro-

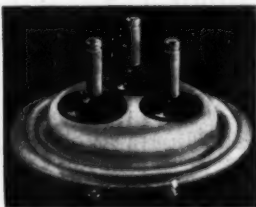
with this smaller unit the heater is optional and will be installed at extra cost.

The new unit, developed by Advance Mfg. Inc., Detroit, and sold by Fruehauf, is the only truck and trailer refrigeration unit featuring automatic defrosting. The motor and everything but the cooling coil is mounted outside the van for easy servicing. With "The Little Giant" the driver simply sets the dial for the desired temperature, fills the gas tank and checks his oil level, then forgets about the unit. The rest is taken care of by the unit itself.

Terminals

THE T. C. Wheaton Company, pioneers in the manufacture of glass for over 60 years, are now equipped to manufacture and supply immediately upon receipt of order, a new Tronex glass-to-steel refrigerator terminal which incorporates the economy and ruggedness of steel fused to Tronex glass. An additional refinement which should be of interest to all users of this type of terminal is the weld projec-

tion shown in the illustration, which relieves the user of the expense and problem of coining or machining the



projection in the motor housing. Most of the major manufacturers of compressors in the refrigeration industry have welcomed this added feature, and many national manufacturers are designing their future requirements for terminals around this Wheaton feature.

A new brochure illustrating both types of Wheaton Tronex Refrigerator Terminals, as well as the other very comprehensive line of Wheaton electronic glass products, can be obtained by writing T. C. Wheaton Co., Industrial Division, Millville, N. J.

Freezer

A NEW mobile six-cubic-foot Frigidaire Feature-Freezer, mounted on wheels and equipped with an eye-catching merchandising panel, promises to be a sure-fire sales builder for groceries, markets, delicatessens, drug stores, confectioneries and similar business houses.

Described as a "traveling merchandiser", the new low-



temperature cabinet will hold approximately 215 pounds of frozen food or ice cream products. It can be moved easily about the store area or pushed outside for display as required by filling stations, roadside stands and markets. The freezer is said to be ideal for spotting "sales specials" of the day.

The freezer, which is finished in gleaming white, comes equipped with an attractive merchandising panel. There are handy guides provided for the insertion of in-

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**Guaranteed
Ready-To-Install**

REBUILT COLDSPOT COMPRESSORS



Exch. Price All Models

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F.O.B. St. Louis, Mo.
Complete as illustrated

NEW CONVENIENT EXCHANGE PLAN SPEEDS-UP COMPRESSOR REBUILDING JOBS—ELIMINATES COSTLY SHOP WORK—ASSURES CUSTOMER SATISFACTION & PROFITS!

HERE'S ALL YOU DO—Ship pump to be exchanged directly to us, freight prepaid, together with your check, or money order, for \$16.50, or order C.O.D. Replacement will be rushed to you same day received, freight collect. All you have to do when replacement arrives is solder in discharge line and suction line. Missing parts, and welding or replacement of cracked casing, will be charged extra to you.

Easy instructions for installation included with every replacement compressor.

Send your exchange compressors to —

**LARGE STOCK ALL
MODELS—REPLACE-
MENTS SHIPPED SAME
DAY RECEIVED.**

Replacements guaranteed for
1 year on pro-rata basis
against material and work-
manship defects.

BEIL & COMPANY

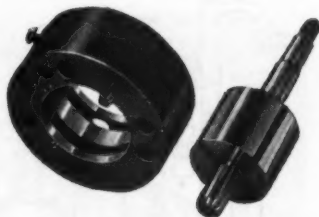
501 SO. FILMORE, ST. LOUIS 22, MO.

**IF YOU WANT TO BE SURE YOUR PARTS ARE
RIGHT FOR THE NEXT COLDSPOT JOB —**

Ask Your Wholesaler for

RIXCO REPLACEMENT PARTS FOR COLDSPOT UNITS

Rixco Replacement Parts are high-quality parts, engineered to factory standards of accuracy, and guaranteed 100%. Furthermore, careful testing of all parts from basic material to finished product is additional assurance that jobs serviced with Rixco Parts will deliver longer, more dependable service. So if you want to be sure your parts are right for the next Coldspot job, ask your wholesaler for Rixco Replacement Parts, or write direct giving name of your regular supplier.



REBUILT ROTOR BLOCK ASSEMBLIES
1/6—1/5—1/4 H.P. Large stock, precision ground and matched sets to fit all Coldspot compressors having 15/32" shafts. For immediate exchange or outright purchase.

Blocks are equipped with new oil hole screw and locating pin. Each and complete sets are tested under actual operation.

Exchange Price, Each	\$10.50
Outright, Price, Each	\$14.25



**No. 150—REPLACE-
MENT CHECK VALVES**
1 to 9 each\$2.45
10 or more ea.\$2.25



CARBON VANES

These Vanes are quiet, easy to lap, save time for the serviceman. Carbon Vanes are standard equipment on all late model Coldspots. \$1.25 set of 4. Specify size required.

We also have available Motor Drive Couplings, Flexible Couplings, Fans, Oil Cooling Coils, Hermetic Discharge Valve Reeds, Main Compressor Bearings, and Bearing Tools.

This Rixco Check Valve consists of a cage, ball, disc, and Neoprene gasket. It saves time and labor . . . eliminates grinding or lapping of the old seat. Every Check Valve is factory-tested. No installation tool required.

RIXCO DISTRIBUTING CO.

7330 Lindell

St. Louis 3, Mo.

SERVICE ENGINEER

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dividual product price cards. By adding a simple slip-over, the freezer can be converted into a frozen food merchandiser. An illuminated canopy attachment, also available.

Of all-steel construction, the cabinet is reinforced by steel corner posts, electrically welded to the sides and bottom, together with insulated steel mullions. There is a stainless top of one-piece construction over a heavy steel sub-top to prevent denting. Rubber insulating collars reduce heat conduc-

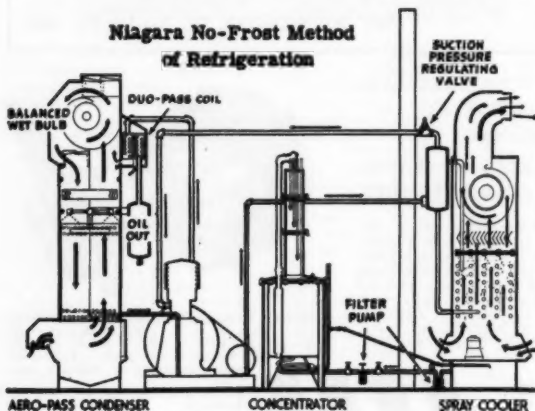
tion from the cabinet top. Insulation is a thick layer of fibrous glass. Asphalt sealing is used throughout. Four heavy-duty casters permit extreme portability.

Completely self-contained, the Feature-Freezer is refrigerated by Frigidaire's compact rotary Meter-Miser compressor, which is hermetically sealed, is self-oiling and protected by a special five-year warranty. Approximate dimensions of the new model are 38½ inches wide and 57 inches high.

Niagara No-Frost

NIAGARA Blower Company announces improved design and construction of apparatus for the Niagara No-Frost Method of refrigeration for space or products, a system which, because it cools air below the freezing point of water without permitting the formation of frost or ice on refrigerant coils, is

maintains the proper concentration of Niagara No-Frost Liquid, the Niagara Aeropass Condenser, which condenses the refrigerant gas and controls the head pressure at which the compressor operates, the compressor, which may be any make selected by the user. These provide a complete refrigeration system



especially applicable to chilling or freezing processes which are improved by avoiding interruptions that may impair quality or limit production. It is also applied in air conditioning and in processes where extremely dry air or extremely low temperatures are required.

The equipment consists of the Niagara Fan Spray Cooler, which chills air and distributes it as required, the Niagara Concentrator, which

that operates with a minimum spread between the suction pressure and head pressure.

As shown in the diagram, air is chilled through contact with coils and a recirculating cold spray of Niagara No-Frost Liquid solution. As moisture is condensed from the air stream this solution becomes diluted, but as this occurs the proper quantity is diverted to the concentrator where the excess water is

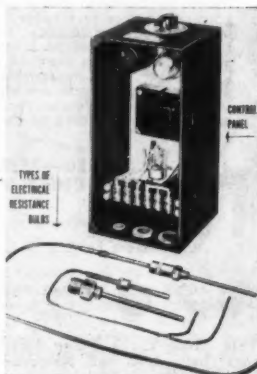
evaporated. The re-concentrated No-Frost Liquid is returned to the spray cooler, assuring continuous operation without interruption for "defrosting."

In the new design a filter in the liquid line removes any dirt or foreign material that the air stream may have picked up and deposited in the liquid, and a metering gear pump is used to insure uniform delivery of the correct amount of liquid to the concentrator regardless of increased pressure resulting from the operation of the filter, and in proper proportion to the amount of condensation taking place in specific cooling or product freezing applications. When the pressure reaches 50 lbs. the operation is automatically shut down by a pressure switch and a warning light signals the operator to clean the filter.

Component units are built in a range of sizes suitable for installations using ten tons of refrigeration upwards.

Electronic Controller

A TEMPERATURE controller, said to be simple, fast, and precise, has been developed by the Instrument Division of Thomas A. Edison, Incorporated, West Orange, New Jersey. The de-



vice uses a single electronic tube with an electrical resistance type bulb for thermal pick-up and is of the on-off type.



You'll **SELL** and **SATISFY** More Families With The **BEN-HUR** Line of Farm and Home Freezers

4-WAY SALES OPPORTUNITY . . . With **FOUR** Ben-Hur Models — 6, 9, 12.5, and 18 cubic foot sizes — you have *four chances* to fit any prospect's need exactly. You have the ideal Freezer for the small family, the small-to-average, the average-to-large and the extra-large family, in city or farm homes.

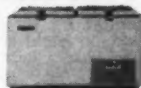
Every one of these four nationally-advertised **BEN-HUR** Freezers is rich in sales features, too. Beautiful styling, table-top design, advanced precision engineering, safety hardware, mechanical perfection — all combine to place the **BEN-HUR** on top in feature-by-feature selling, and promise years of economical food freezing. The **BEN-HUR** Freezer line is a fast-selling, high-profit prestige builder — backed by aggressive national advertising and a powerful merchandising program keyed to results for *you*. The best dealers are proving this. Only a few territories still available. Write for details.

BEN-HUR MFG. CO.

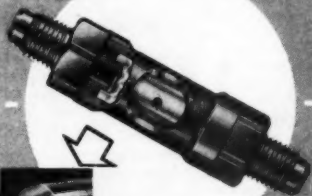
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BEN-HUR

FARM and HOME FREEZERS



the **LIQUID EYE**



MALE-FEMALE

2 new models

a NEW type of liquid indicator

SAFE . . . LEAK-PROOF . . . EASY TO INSTALL . . .

Fully enclosed **GASKET**

The pliable gasket is enclosed on three sides by a brass housing, prevents the gasket from creeping.

Lapped **GLASS**

Lapped glass surface makes a fourth side to fully enclose the gasket making a perfect seal. See inset above.

Ask to See the **LIQUID EYE** at Your Jobber

PERMANENT COPPER FLARE INSERT simplifies direct installation on dryers or receivers. Eliminates use of extra flare nuts thus fewer connections are necessary.

DOUBLE PORT
ELIMINATES PRESSURE DROP
POSITIVE REACTION OF INDICATOR
FLOATING PYREX TUBING INSURES SAFETY
PLIABLE GASKETS, IMPERVIOUS TO
REFRIGERANTS AND OIL

ALLIN MANUFACTURING COMPANY • 1153 W. GRAND AVE. • CHICAGO 111

SERVICE ENGINEER

111

August, 1948

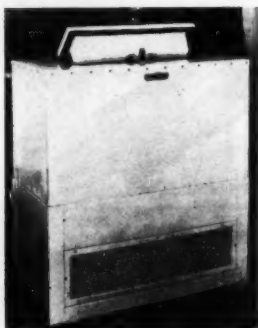
The use of the resistance bulb permits location of the sensing element at a point remote from the control panel and eliminates the necessity of thermal compensation. This device, which is non-indicating, may be used to control temperatures to close tolerances in solids, gases, or liquids. Units are available to cover the temperature range from -100°F to 1200°F and are adjustable within a range of several hundred degrees.

Supply voltage may be 115 or 230 volts 50-60 cycle alternating current. Load capacity is 30 amperes at 115 volts, 20 amperes at 230 volts. Accuracy of the controller is independent of usual voltage variation. Normal response time is under three seconds, due to the patented bulb construction.

A $5\text{''}\times 5\text{''}\times 10\text{''}$ control panel, weighing less than 8 lb., complete, is furnished and is provided with conduit knockouts and a rugged terminal board. This may be located at any convenient place and at considerable distance from the temperature zone.

Freezer

A NEW research and testing tool for use in industrial, university, trade association and research institute labora-



tories, is the latest development of Wilson Refrigeration, Inc., of Smyrna, Del., manufacturers of home and farm freezers, commercial refrigeration and milk coolers.

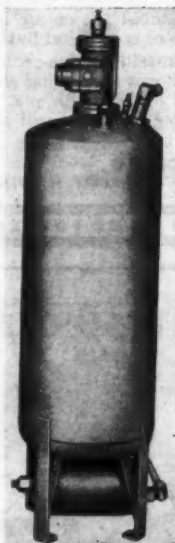
This development is a small, compact low temperature cabinet capable of hold-

ing a minus 40 degree temperature. The one shown here, built for a midwest machine tool company, is particularly useful for research and testing purposes.

The capacity of the cabinet is rated as one and a half cubic feet and has eight inches of insulation, a new type rubber throat and an all-steel lift lid.

Water Cooler

THE high capacity of a new industrial type water cooler has made it possible to apply a complete system without the use of space-



consuming storage tanks. Relatively small sized tanks only are required where water is used intermittently in very large quantities. Known under the trade name Temprite, this compact cooler measures only 14 inches in diameter by 54 inches high, the result of its ability to cool water instantaneously through rapid heat transfer. Design is based on the so-called "flooded" cooling principle which was originated by the manufacturer. Water coils are submerged in the liquid refrigerant itself and the heat of the water being used passes directly into the

main body of the refrigerant.

In addition to water, the unit will cool alcohol, light oils, beverages, certain chemical solutions and other liquids. Besides general industrial applications, the Temprite is intended to be used for liquid cooling in bottling plants, bakeries, hospitals, hotels and institutions, certain air conditioning equipment and process cooling.

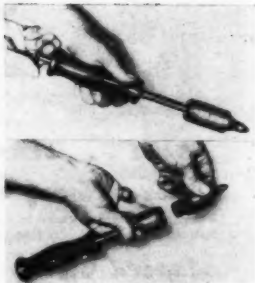
This high capacity cooler will deliver, for example, 1185 gallons of 40 degree water per hour, assuming a 60 degree inlet temperature or 675 gallons per hour of the same, assuming an 80 degree inlet temperature. Water is cooled only as required, eliminating unnecessary operation of the refrigeration machine. With the aid of an automatic control valve, water temperature is said to remain constant whether one gallon or full load is being imposed on the cooler.

Completely equipped with liquid refrigerant and control valves, the cooler operates with the refrigerant temperature only 4 degrees lower than the desired exit water temperature, thus allowing the use of a high-suction pressure condensing unit.

Manufactured by Temprite Products Corporation, 45 Plquette Avenue, Detroit 2, Michigan.

Soldering Iron

REQUIRING no electric current or external heat of any kind, a new soldering iron, known as the Quik-Shot, utilizes a chemical cart-



ridge that heats the iron to working temperature in 5 seconds, and maintains intense heat for fully 10 minutes. The cartridge, which is



**TINIT IS UNIFORM
IN QUALITY ALWAYS!**

TINIT is compounded by a process that never varies . . . you're sure that TINIT will always work the same . . . always dependable. Cleans, tins and fluxes stainless steel, black iron, hard-drawn copper and all metals in one quick operation. Sold by refrigeration service, tinning supply, automotive and other jobbers for 18 years.

TINIT MFG. CO., INC.

P. O. Box 794, Denver, Colo.

BUY FROM YOUR JOBBER

STATOR WINDING

for Hermetically
Sealed Units.

All models 1/20 to 1/5
hp. Exchange price, \$7.50
f.o.b. Chicago.

Send old stators prepaid.
90 day guarantee.

We do not rewind open
type motors.



BERDOR ELECTRIC CO.

3609 N. Lamon Ave.

Chicago 41, Ill.

GASKETS

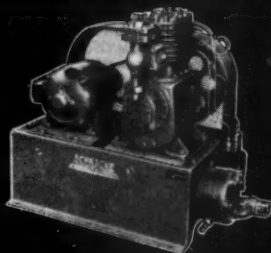
GASKETS



• Play safe and specify CHICAGO-WILCOX gaskets for every refrigeration need. Our complete gasket service provides a dependable source of supply to meet your requirements. Get full details to-day.

Write for complete catalog
CHICAGO-WILCOX MFG. CO.
7701 Avonlea Ave. Chicago 19, Illinois

SCHNACKE COMPRESSORS and *Complete* CONDENSING UNITS



**THE INDUSTRY'S MOST
Easily SERVICED UNITS**

For detailed Service
and Engineering data, write
SCHNACKE, INC.

1024 Columbia Street EVANSVILLE, IND.

NEW • PRACTICAL • CONVENIENT RAPID DEHYDRATOR KIT

Boon to servicemen for truck storage of more of the practical sized, refillable dehydrators. Sliding drawers for replacement adapters and gaskets. Assures impressively clean packages at place of installation. Kit will soon pay for itself in saving needless return trips. See this utility item at your wholesaler's today.

Fine **PRODUCTS COMPANY**
185 NORTH WABASH AVENUE • CHICAGO 1, ILLINOIS



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about the size of a small flashlight battery, contains a primer and is ignited in a manner similar to that of firing a bullet. When the cartridge is placed in the copper tip of the iron and the spring rod is pulled and released at the back of the handle, the pointed rod strikes the primer and sets off the heating action, which is created by a chemical mixture of certain metal powders and an oxidizing agent. The cartridge is absolutely non-explosive.

Ideal for all kinds of outdoor work where blowtorches are ordinarily required, the Quik-Shot iron is very convenient for indoor work anywhere in home or plant because of its freedom from the need to work near electrical outlets, as is the case with electric irons. Its safety features are also significant, since this iron is likewise free of electrical or fire hazards. Also, there are no breakable or replaceable parts, since the construction is completely mechanical and therefore very rugged. The heat developed is almost 200 watts, hence the iron can be used on heavy as well as light soldering jobs. A new cartridge is used each time the iron is operated.

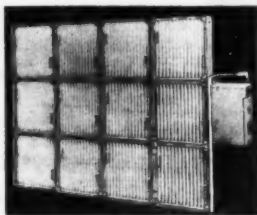
The Kemode Manufacturing Company, manufactures and distributes the Quik-Shot iron, which retails for \$5.95. This price includes a package of 4 cartridges. Additional packages are available at 49 cents. Several sizes of interchangeable tips are also provided at \$1.50 each.

Electro-PL

AN electronic air filter, the Electro-PL, has been developed by American Air Filter Co., Inc., Louisville, Ky., with an intermediate cleaning efficiency for applications where the efficiency of a mechanical filter is too low and that of an electronic precipitator is unnecessarily high. The new filter is basically an electronic precipitator without an ionizing unit and contains a collector element of electrostatically charged Airmat paper.

This paper is a laminated cellulose product composed of a number of plies of porous, tissue-like sheets formed

of short fibres in "jack-straw" arrangement and is also used as a filtering media in mechanical filters. When an electrostatic charge is applied to the paper, the plies



tend to separate and each individual fibre becomes a collecting electrode which attracts and holds dust and smoke particles. This action

practically doubles the cleaning efficiency of Airmat paper.

Since the Electro-PL will continue to function as an efficient air filter when de-energized, its operation may be varied to suit the dust condition—as an electronic air cleaner during the winter months when a smoky atmosphere is prevalent and as a dry-type air filter during the summer months.

The elimination of the ionizer not only reduces the first cost of the filter below that of an electronic precipitator but also results in lowered power consumption. Maintenance is also simplified since the low-cost Airmat paper is replaced with new material when it accumulates its full dust load.

TRADE LITERATURE

Marlo "Selectomatic" Charts

PROPER balance of "high side" to "low side" apparatus is of extreme importance to efficient and economical refrigeration. The selection of the proper unit for the refrigeration application is necessary for the maintenance of required conditions within a refrigerated space. "Undercoiling" causes low relative humidities which result in costly dehydration of meat and vegetables in storage. Most methods of unit selection for a given application are complex because of the number of variables introduced by such factors as total load, latent heat, humidity and product load. Improper unit selection, due to these involved calculations, oftentimes results in a unit being specified which fouls with frost under high latent loads. Exces-

sive compressor running time, uneconomical operation at lower capacities and the ultimate deterioration of food products is frequently due to units having improper air volume, fin spacing and fin to tube ratio. The new Marlo "Selectomatic" charts provide busy refrigeration engineers with a fast, accurate method of selecting the proper Marlo units. Substantiated by thorough laboratory tests, as well as actual field performance data, these new charts are the result of years of experience.

The new Selectomatic charts are easy to read and simple to use. All normal ranges of refrigeration are covered and the problem of selecting the correct unit for the application requires only a pencil and a copy of the "Selectomatic" chart.

Copies of this new chart will be mailed free of charge. Write Marlo Coil



Some Jobs are Easier than Others

But the man who has been trained to go about a job right—does it the easiest way. C.T.I. training is for the man who wants to think as he works. It's for the man who wants to **GET MORE DONE and EARN MORE.** Full or part time Residence course or Combination Home & Shop Training. Veterans—

C.T.I. course approved under G.I. Bill. Non-Veterans—Do not let lack of ready cash delay your start. Investigate our Pay After Graduation Plan and our Low Easy Payment Plan. Write for our Free Booklet and interesting publication **SKILLED TRADESMAN.** No obligation.

Commercial Trades Institute, Dept. A99-8

1400 W. Greenleaf Avenue

Chicago 26, Ill.

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Gentlemen:

Please send me free information about your training in Refrigeration & Air Conditioning.

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Address _____

City _____

State _____

Farm & Home Freezers

ACE
CABINET
CORP.

NEW BEDFORD, MASS.



Self Contained
and Remote



For men who want to know more about

AIR CONDITIONING, REFRIGERATION & HEATING

Write for free booklet and class
starting dates

Detroit Air Conditioning Institute
4125 Grand River Detroit 8, Mich.

NEW! "ALCO-FLAME" LEAK DETECTOR

Here it is... the new Justrite Leak Detector, Model 1240—designed to burn alcohol. Quickly detects leaks in refrigeration systems using halide gases... helps on repair work.

This handy tool is also a soldering iron or a blowtorch. Comes complete with soldering tip and flame reducer. Easily convertible.

It's handled the same as the famous Justrite "Gas-Operated" Leak Detector. Built of the finest materials. Simple construction. Proven design.

The Justrite "Alco-Flame" Leak Detector, Model 1240, is ready for delivery. See your jobber today.

JUSTRITE MANUFACTURING CO.

2063 N. Southport Ave., Dept. B-7, Chicago 14, Ill.



RECORDING INSTRUMENTS of Air Temperature and Motor Operation

These instruments take the guesswork out of trouble-shooting on any type of refrigeration equipment. With them you can automatically chart a written record of the true performance of the equipment you are servicing in the home, store, or cold storage plant. Such charts, taken before and after the job, are good proof of work well done.

Tempscribe styles for refrigeration service:

Temperature Ranges: — 20° to + 40° F., or — 10° to + 50° F.

Operation Recorder: either Type D for series connection up to 250 volts, or Type C for parallel connection up to 250 volts.

Ask your jobber about *TEMPSCRIBE* or write for Bulletin 731.

BACHARACH INDUSTRIAL INSTRUMENT CO., 7000 BENNETT ST. • PITTSBURGH 8, PA.



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August, 1948

Company, 6135 Manchester Ave., St. Louis (10) Missouri.

★ ★ ★

New Film by South Bend

A NEW 16 mm. colored film, "Grinding and Use of Basic Lathe Tool Cutter Bits", has been announced by the South Bend Lathe Works. It is Film III in the series of films based on the book "How To Run A Lathe". This film shows the various steps necessary to properly grind and use cutter bits for lathe operations such as threading, facing, boring, forming, turning, cutting-off, etc. The films are distributed on a free loan basis, and are also available for outright purchase.

This new sound film has been professionally produced in full color under the direction of expert machinists and experienced educators to provide an effective and accurate instructional medium. Each step in grinding various types of cutting tools is shown in detail and reasons given. Each type of cutting tool is shown in use and proper alignment with the work emphasized. Thread cutting is shown step-by-step from the thread tool grinding, through setting up the lathe, and starting and finishing the thread.

Other films available in this series are: Film I, "THE LATHE", which shows what the Lathe is, what the Lathe is for, and how its various parts work; and Film II, "PLAIN TURNING", which shows each operation required to machine

a straight cylindrical shaft between centers.

All films in this series are 16 mm. full color with sound track and are approximately 800 feet in length. Screen time is about 20 minutes each. Complete information on securing the use of these films can be had by writing to the South Bend Lathe Works, 207 East Madison Street, South Bend 22, Indiana.

★ ★ ★

Bakery Refrigeration Data

A NEW Refrigeration Guide for Bakery Ingredient Water Cooling and Jacket Water Cooling is announced by the Filtrine Manufacturing Company, 53 Lexington Avenue, Brooklyn 5, N. Y. Technical data on cooling factors involved in the preparation of baked products is presented in condensed, easy-to-use form and a concise list is given of the heat constants to be considered in the process of dough mixing. A typical bakery problem and its solution further clarifies the manner in which this guide can be employed to help achieve uniformity of results. This material is available on request. Write for form 733-E.

★ ★ ★

Water Cooler Story

A FREE copy of a 24-page booklet showing the need for properly cooled, good, pure drinking water, is yours for the asking.

This booklet, entitled, "The Water Cooler Story," has been recently published by the Drinking Water

Cooler Association. It is not a sales booklet and deals only with the need for and value of pure drinking water as an aid to health, vitality, efficiency, morale and good will. It points out the value of water coolers in factories, offices, stores, hospitals, schools, public buildings, institutions, etc., and gives typical plans for suggested installations as well as the various types of units.

Secure your free copy by writing to Refrigeration Equipment Manufacturers Association, 1107 Clark Building, Pittsburgh 22, Pennsylvania.

★ ★ ★

Copeland Catalogs

COPELAND Refrigeration Corporation of Sidney, Ohio, has just issued three new catalogs—a commercial catalog No. 48 on belt driven units and compressors; a parts catalog No. 48 on open type units, water coolers and compressors; and a parts price list No. 48.

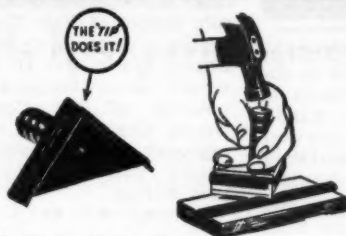
These three catalogs provide up-to-date descriptive and illustrated material on the Copeland line of open type units, compressors and parts. They may be obtained upon request from the company.

★ ★ ★

Worthington Bulletin

THE Worthington Pump and Machinery Corporation has just issued a new eight-page bulletin describing their evaporative coolers. In addition to complete descriptions and illustrations of the various types available, several specification sheets are provided.

JARROW DOOR GASKET NOTCHER



Makes Perfectly

Mitered Corners

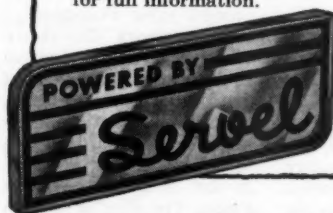
The protruded rounded tip of a Jarrow Door Gasket Notcher takes out the precise amount of rubber necessary to form a perfect non-bulging gasket corner that will not leak air. Easy to use—merely place tool on gasket, strike it with a hammer and a perfectly cut gasket results. Blade may be easily removed for replacement or re-sharpening. Save time and money by ordering one from your wholesaler.

ONLY \$4.98



Four high-speed drills...

—cut oil passages through four Servel Supermetic crankshafts simultaneously. Deep-hole, high-precision drilling helps explain the superiority of Servel's lubricating system. Call your Servel distributor for full information.



Electric Refrigeration Division
SERVEL, INC.
EVANSVILLE 20, INDIANA



MINI-VOLT

Instantly read voltages right off dial. 65 to 660 v. AC. Also DC. Virtually burnout-proof. Guaranteed for 10,000 hours' operation. Plastic case. 12" flexible test leads. And only \$2.50 list!

- Not only distinguishes between 110, 220 etc. volts, but measures line voltage close enough to show up to 2 or 4 volt drop between meter and load terminals on 110 v. line.
- No refrigeration serviceman need now be without definite knowledge of whether faulty operation of motors, magnetic valves, etc. is due to improper terminal voltage.
- Checks for blown fuses, accidental grounds, circuit continuity. Useful for electrical trouble-shooting in general.
- Warns of "live" wires and equipment, as protective measure.

It's a "must." Saves time, money, life and limb! Order from supplier, or from

INDUSTRIAL DEVICES, INC.,
EDGEWATER 11, N.J.

FREON-12

All you want in
145 LB. KINETIC CYLINDERS

Call, Wire or Write

PENO ROBISON
Ft. Smith, Ark.

PERSONNEL NOTES

Frigidaire promotes Lehman

F. E. LEHMAN, Manager of the Sales & Service department of Aeroproducts division of General Motors, has been named Assistant Commercial Sales manager of Frigidaire division, W. F. Switzer, Frigidaire's



F. E. LEYMAN

Commercial Sales manager, announced recently.

A veteran with more than 16 years of experience in the sales and service fields, Lehman first became associated with Frigidaire in 1931 when he joined the Service Technical division. After serving as a field contact representative on service problems, he was placed in charge of service technical literature for the Field Service organization.

He was transferred to the Commercial Sales department as a sales engineer in 1937. In 1940 Lehman was promoted to zone manager, contacting midwestern districts for Commercial Sales. Shortly after the out-

break of World War 2, he was transferred to the Aeroproducts division as Service Manager, handling propeller service problems on a global scale for the Army Air Forces.

Lehman was promoted to Manager of the Sales & Service department of Aeroproducts division in January of 1946. He remained in that capacity until his recent appointment with Frigidaire division.

★ ★ ★

Franklin Wedge Of Ansul Chemical

FRANKLIN WEDGE, former eastern manager for Ansul Chemical Company, has been appointed assistant to the



FRANKLIN WEDGE

president. He has moved from Philadelphia to the company's main office at Marinette, Wisconsin.

With this assignment, Wedge, a well-known figure in the refrigeration industry, climaxes an 18-year career with Ansul. He is a member of the American Society of Refrigerating Engineers as

well as the American Chemical Society.

Wedge was graduated from the Sheffield Scientific School of Yale University, class of 1918. During World War II, he served as a temporary member of the Coast Guard Reserve and for two and one half years helped patrol Philadelphia harbor.

★ ★ ★

Skinner Now V.P. of Philco

APPOINTMENT of James M. Skinner, Jr., as Vice President—Service and Parts Division of Philco Corporation was announced recently by James H. Carmine, Vice President—Distribution.

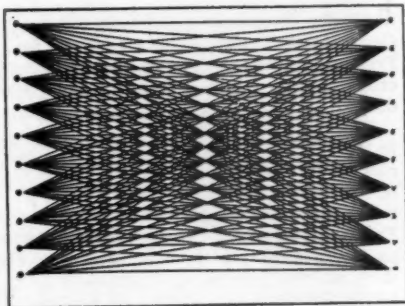
In this new position, Mr. Skinner will direct the nationwide Philco service organization and also be in charge of all parts sales.

Mr. Skinner received his education at Penn Charter School and the University of Pennsylvania. He joined Philco in 1934 and for two years was a special assistant to the vice president in charge of merchandising. After serving in the statistical department of the Company's sales organization, Mr. Skinner was named sales manager of the Accessory Division when it was formed in 1940 to handle all sales of dry batteries, radio tubes, parts and miscellaneous products. During the war, Mr. Skinner helped organize and direct the Philco Training School on electronics and radar which the Company established for the Army and the Navy, and since

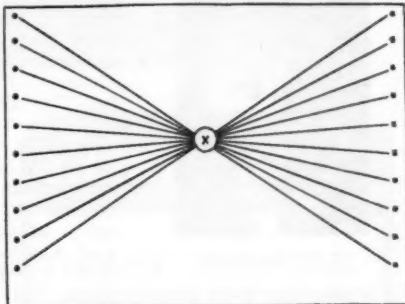
How Your REWA Wholesaler Helps you save Time and Money

It's a confusing picture, isn't it—that diagram of criss-cross lines? However it shows visually how your wholesaler saves you time and money.

It shows what happens when 10 dealers deal directly with 10 manufacturers. The 100 connecting lines represent 100 transactions in which only one purchase is made from each manufacturer by each dealer. If there were 20 dealers and 20 manufacturers, there would be 400 transactions.



Now let's look at the next diagram in which X marks the position your REWA refrigeration wholesaler occupies. It's a much clearer, simplified picture, isn't it? Instead of 100 transactions for the dealers and for the manufacturers, there are now only ten. In other words, your wholesaler has reduced the time and effort expended in the 100 transactions by 90%.



Over 180 wholesaler members of REWA with 300 branches across the country displaying this emblem of service and integrity, are ready to serve you with their facilities and stocks of refrigeration and air conditioning parts and supplies.



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1945, he has been General Manager of the Accessory Division of Philco.

★ ★ ★

E. G. Biechler Dies

ELMER G. BIECHLER, first President and General Manager of the Frigidaire Division, General Motors Corporation, died in Dayton on July 5.

His career bulks large in the story of Frigidaire's rise to leadership for, 30 of his 58 years were spent with Frigidaire and with Frigidaire's parent company, Delco Light, through which early electric refrigeration came into its own.



E. G. BIECHLER

When the Delco Light Company was formed in 1916, Mr. Biechler was appointed Traffic Manager and Purchasing Agent. Successive promotions carried him through the posts of Assistant Sales Manager and Sales Manager. In September, 1924, when R. H. Grant, Sr., Delco Light President, was transferred to the Chevrolet Motor Company, Mr. Biechler succeeded to the office of President and General Manager.

Mason M. Roberts, General Manager, has sum-

med up Mr. Biechler's career as follows:

"Those of us who worked with him in the industrial organization which, in a large measure was literally created out of his deep convictions and keen foresight, learned not only to respect him but to love him greatly. "Our finest tribute to him is our determination to continue with the fundamental principles which he laid down."

★ ★ ★

Representatives For Ben-Hur

BEN-HUR MFG. CO., Milwaukee, Wisconsin, manufacturers of Ben-Hur Farm and Home Freezers, announce the recent appointment of seven new district sales representatives. Ralph K. Zickert will work with Ben-Hur distributors and dealers in Wisconsin, Illinois, Minnesota, and North Dakota with headquarters in Milwaukee. Richard P. Busch, formerly of the Milwaukee staff, has been moved to York, Pennsylvania from where he will travel through Pennsylvania, the New England states, New York, and Washington. D. C. William P. Stone, from headquarters in Cincinnati, will represent Ben-Hur in Ohio, Indiana, and Kentucky. Russell L. Wirick, Memphis, Tennessee, will be responsible for the states of Tennessee, Arkansas, Missouri, Louisiana, and Mississippi. Ben-Hur Freezers will be represented in the state of Texas by Morgan H. Cobb, making his headquarters in Fort Worth,

while C. Kelley Bogle, Marietta, Georgia, will be in charge of operations in the state of Georgia. Oklahoma and Kansas distributors will see Walter Engard, who makes his headquarters in Tulsa.

The new appointments are part of a continuing expansion program of the company, according to A. B. Bechaud, vice-president, and are necessary to maintain closer contact with the merchandising aims of Ben-Hur distributors and dealers throughout the nation. They reflect the expressed principle of close factory cooperation so important in promoting the successful sale of freezers to the farm and city homes of the nation today—a program of continuing and ever-increasing education of appliance salesmen and prospective users in the benefits of home freezing and storage of foods.

★ ★ ★

Burkhardt to Walter Hervey Junior College

CHARLES H. BURKHARDT, of 188-02 64th Street, Flushing L. I., has been appointed to the faculty of Walter Hervey Junior College, 15 West 63rd Street, Donald E. Deyo, director, announced.

He will be an instructor in refrigeration and air conditioning engineering. A graduate of St. John's University, he was formerly head of the automatic oil heating department of the YMCA Trade and Technical School. Prior to that position, he was connected with the Concord Oil Company and the United Shipyards.

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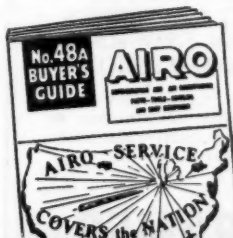


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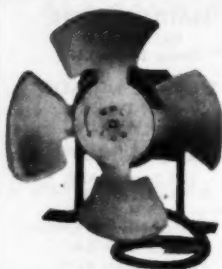
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